

# THE AUTOMOBILE

VOL. XIV.

NEW YORK—THURSDAY, MAY 31, 1906—CHICAGO

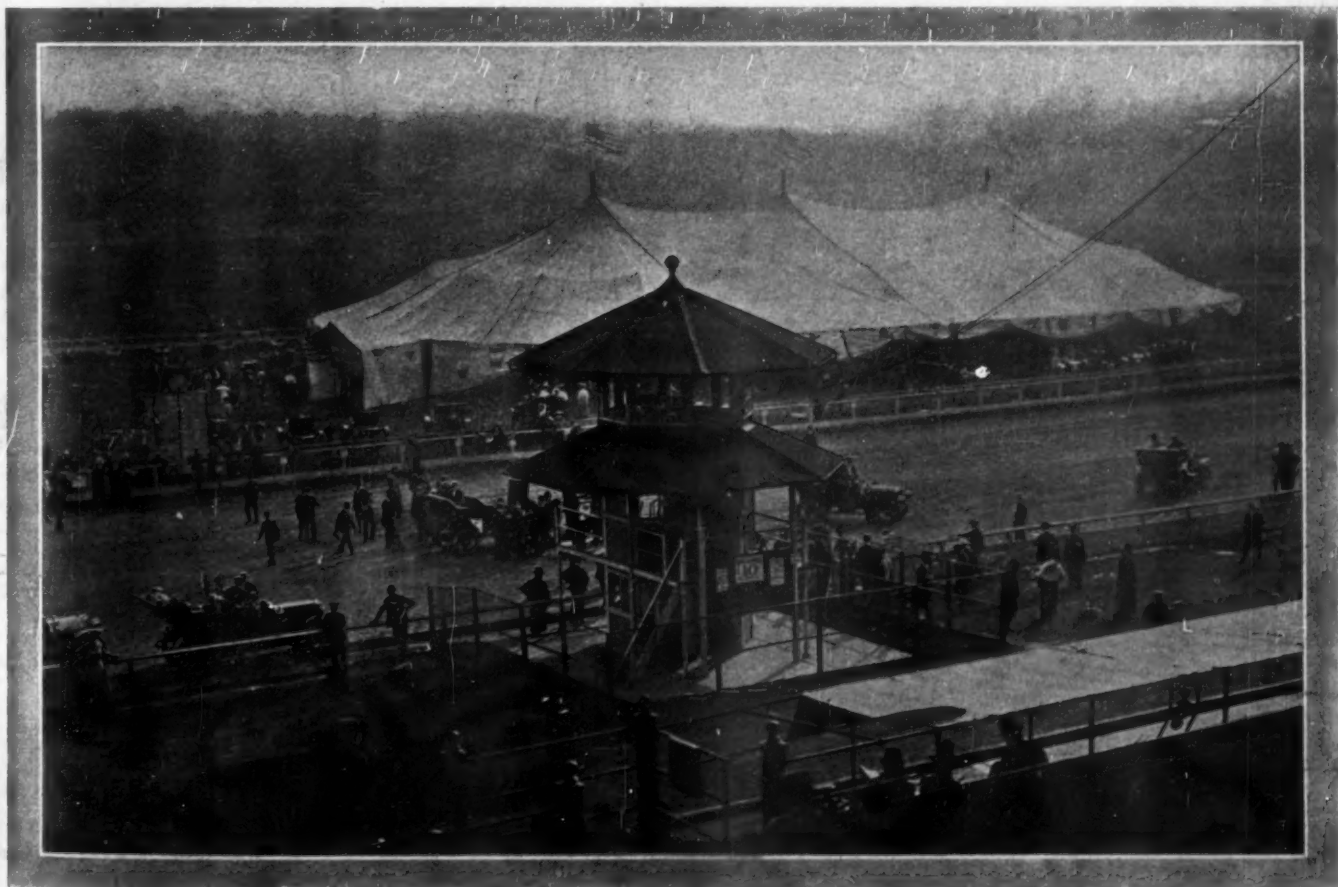
No. 22

## NEW YORK CITY HAS AN OPEN-AIR SHOW

New York City had its first open-air show—and it was the first in this country—at the Empire City track, May 24, 25 and 26. While the effort of the New York Automobile Trade Association was not the great success which some of its promoters anticipated, it certainly was not the failure which others predicted. A substantial profit was accumulated, and sales were numerous enough to encourage the belief that an open-air exhibition at another time could be developed into a big affair, providing it had the support of the manufacturers themselves.

With no building large enough to supply plenty of exhibiting room for the entire industry, it is plainly apparent that if shows are to continue the principal one of the future must needs be held outside the confines of an erected structure.

The big tent held a varied line of exhibits, and many availed themselves of the opportunity of inspecting the goodly array of 1906 models, many of course having already had an earlier look at the winter shows. The accessories concerns were not exactly happy under the grandstand, and consider on the next occasion that they, too, should also have a tent.



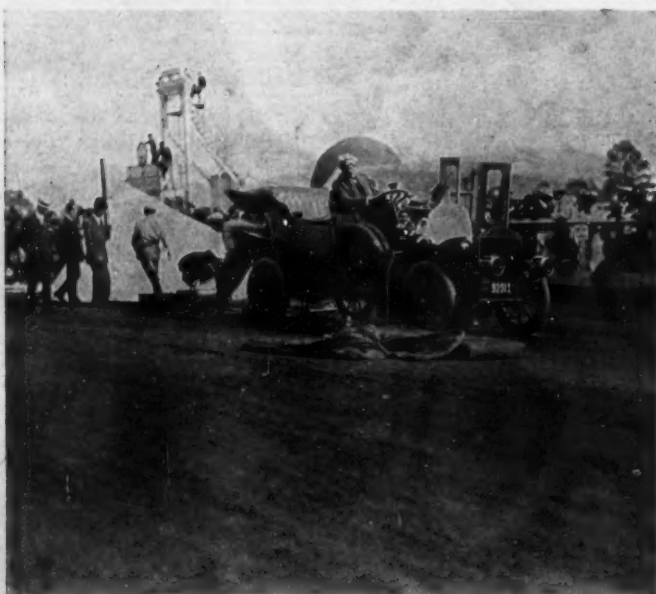
THE BIG TENT AT THE EMPIRE CITY TRACK OPEN-AIR SHOW WHEREIN THE VEHICLE EXHIBITS WERE DISPLAYED.



A GOBRON-BRILLIE PLOUGHING THROUGH THE SAND.



L. R. SMITH IN MAXWELL WINNING OBSTACLE RACE.



EZRA FITCH, WHOSE WHITE CARRIED CAMPING OUTFIT.

Chairman W. M. Harradon and Frank Eveland, C. Andrade, Jr., Percy Owen, and Secretary Reeves worked hard to obtain satisfactory results.

An autumn show is talked of, when the 1907 models will be available, but the question may arise as to what attitude the N. A. A. M. might take in the premises. Whether it would permit a local open-air show in New York City in view of the fact that it had objected to a similar event in Buffalo is a proposition that would come before its executive committee.

#### President Morris Opened the Show.

Perfect weather and appreciative, if not numerous, spectators, marked Thursday, the opening day. In the grassy oval within the track was pitched the enormous tent, under which the exhibits of complete automobiles were installed; twenty-four makers had taken all the space marked off for exhibitors. Under the grandstand were the booths of the exhibitors of accessories. The mile track was used for practical demonstrations of the machines, and also for races and other contests designed to bring out the power, braking qualities, economy, steadiness, and other points in the contestants.

Early in the afternoon Dave Hennen Morris, president of the Automobile Club of America, mounted an automobile and, after a short address, declared the show open.

"The idea of this open-air show is an excellent one," said Mr. Morris. "The exhibition supplies a long-felt want, and



PRESIDENT DAVE H. MORRIS, A. C. A., OPENS THE SHOW.

I hope every visitor will make each exhibitor take him on the track and prove everything he claims for his car. I am satisfied at the recognition of our club in this trade gathering. We have always done our best to encourage the sport and the industry, and I believe there should always exist co-operation between the trade and the clubs. I declare this show open."

Interest was about equally divided between the track events, the restaurant in the clubhouse, and the inflation of the hot-air balloon, which, by the way, had just enough energy to carry it over the roof of the grandstand, the two aeronauts who were to have made a thrilling parachute drop falling ingloriously into the paddock.

Following is the summary of the track events:

#### FLEXIBILITY TEST.

For 4-passenger gasoline cars; 1 mile speed trial and 1-4 mile slow speed trial on high gear, flying starts.

1. Aerocar, 24 h.p.; Percy Owen, driver .....700 points
2. Welch, 50 h.p.; driver, Burgoyne Hamilton .....534 points
3. Northern, 20 h.p.; driver, Peter Fogarty .....510 points
4. Bayard Clement, 24 h.p.; driver, S. Bowman .....508 points

#### BRAKE TESTS.

For cars claiming 40 miles an hour or more. Cars to cover 1-3 mile in 11 2-5 seconds or less and apply brakes on signal.

1. Oldsmobile, 30 h.p.; driver, Ernest Keeler; time, 10 sec.; stopped in 168 feet.
2. Marmon, 20 h.p.; driver, T. E. Schultz; time, 10 sec.; stopped in 168 feet.

#### BRAKE TEST.

For cars claiming 30 miles an hour or more. Cars to cover 1-3 mile in 19 seconds or less and apply brakes on signal.



1. Cadillac, 10 h.p.; driver, W. C. Martin; time, 18 1-5 sec.; stopped in 66 feet.
2. Northern, 20 h.p.; driver, Peter Fogarty; time, 16 3-5 sec.; stopped in 88 feet.

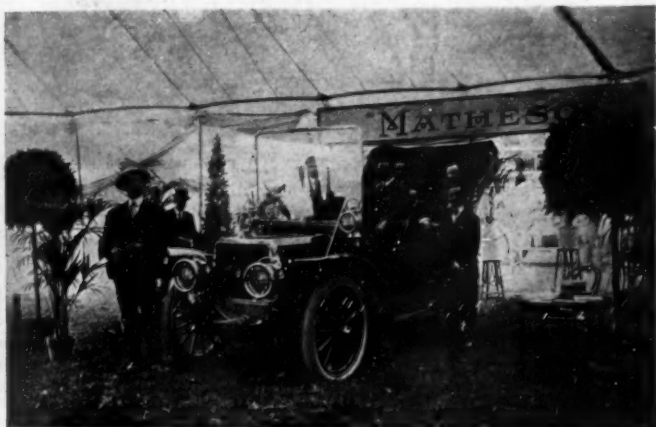
## ONE-MILE MATCH RACE.

1. Franklin, 12 h.p.; driver, E. Easter ..... 1:45
2. Frayer-Miller, 34 h.p.; driver, P. Fisher .....

## Friday Had an Economy Test.

Friday's interesting feature was the economy test, in which each of the competitors was provided with one pint of gasoline, and prizes were awarded for the greatest distance traveled per horsepower hour. The event was won by Walter C. Martin, driving a 10-horsepower single-cylinder Cadillac, who fell barely short of five miles in his performance. Figured out on the basis of the recent two-gallon efficiency contest, 5 miles on a pint of gasoline is equal to 80 miles on two gallons of the same fuel. The officials used the formula that ten cubic inches of piston displacement equals one horsepower, therefore the winning car covered 2,681 feet per pint of gasoline per horsepower per hour.

The sand pit test proved an easy task for the majority of the cars entered. A 75-foot stretch of sand was provided with sand one inch deep at the start, gradually increasing to a depth of two feet at the finish. Start was made five feet from the entrance. E. B. Blakeley drove his 30-35-horsepower Ardsley through in 9 seconds, and G. L. Lighthall, in a 36-horsepower Welch, went through in 9 2-5 seconds. These were the only cars to get through inside the 10-second mark.



WHERE THE BALLOON DESCENDED THURSDAY.

The track at all times, when not in use for the contests, was crowded with demonstrating parties, who oftentimes indulged in impromptu brushes. Summary:

## EFFICIENCY TEST.

Prize for greatest distance traveled per horsepower hour on one pint of gasoline from reservoir furnished by committee.

1. Cadillac, 9.8 h.p.; driver, Walter C. Martin; distance, 26,275 feet; 2,681 feet per pint per horsepower hour.
2. Aerocar, 20.09 h.p.; driver, Percy Owen; distance, 15,935 feet; 793 feet per pint per horsepower hour.
3. Frayer-Miller, 26.4 h.p.; driver, Frank Lawwell; distance, 16,225 feet; 614 feet per pint per horsepower hour.
4. Northern, 24.9 h.p.; driver, Peter Fogarty; distance, 10,920 feet; 438 feet per pint per horsepower hour.

## POWER TEST.

Prize awarded for best time made through prepared stretch of deep sand, 75 feet in length. Open to all classes of power.

1. Ardsley, 30-35 h.p.; owner and driver, E. B. Blakesley... :09
2. Welch, 36 h.p.; owner and driver, G. L. Lighthall..... :09 2-5

## REVERSE GEAR 75-YARD DASH.

Open to all planetary transmission cars.

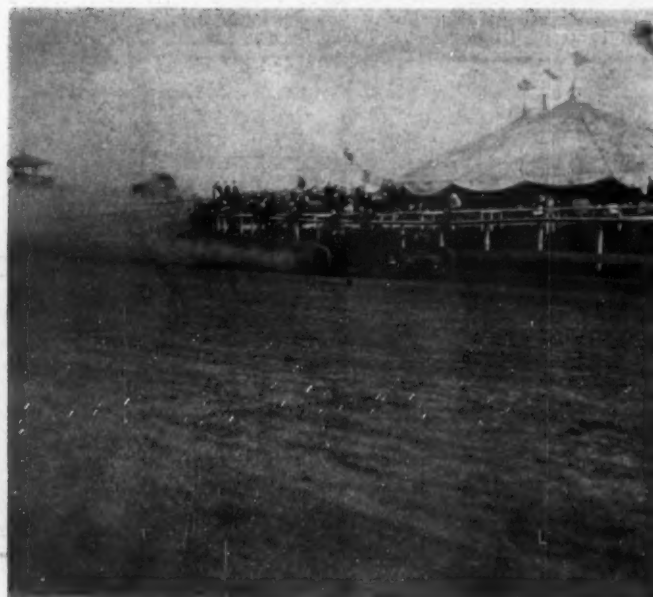
1. Welch, 50 h.p.; driver, Hamilton ..... :12 4-5
2. Northern, 20 h.p.; driver, Peter Fogarty ..... :21 4-5

## Closing Day of the Show.

Well attended was the third and closing day of the show, the unmistakable feature of which was Walter Christie's exhibition mile in 53 seconds, a duplication of Barney Oldfield's Peerless Green Dragon figures. Christie took two flings at the mark, his first dust-whirling circuit being :54 1-5, when he knew that the "Blue Streak" could easily equal the world's record and perhaps lower it. The soft condition of the track surface made the going a little uncertain, and rounding the



AN EXHIBIT THAT WAS TASTEFULLY DRESSED.



GENERAL VIEW UNDERNEATH THE BIG TENT.



WALTER CHRISTIE DOING HIS RECORD MILE.

turns, the driver shut off power, once skidding dangerously close to the fence. Christie again intends to try for a place on the American team for the Vanderbilt race.

Ernest Keeler was the Oldsmobile winner of the vibration test, spilling only three-eighths of an inch of water in the 200-yards spring from a standing start. M. J. Wolfe, with an Autocar, most successfully pulled 500 pounds of dead weight 200 yards. Louis R. Smith excelled with a Maxwell in the runabout division of the obstacle event and A. L. Kull, with a Wayne, was successful in the touring-car class. Ezra Fitch was an easy winner as the best-equipped touring car for a thirty-day trip, his White steamer carrying a complete camping outfit. The balloon ascension was so long delayed that the crowd didn't wait to see if it took place. Summary:

#### VIBRATION TEST.

Cars to go 200 yards from standing start on high gear, carrying pail filled with water.

1. Oldsmobile, 28 h.p.; driven by Ernest Keeler. Loss, 3-8 inch.
2. Gobron-Brillié, 36 h.p.; driven by E. Hansch. Loss, 3-4 inch.
3. Wayne, 50 h.p.; driven by A. L. Kull. Loss, 6 1-4 inches.

#### TRACTION TEST.

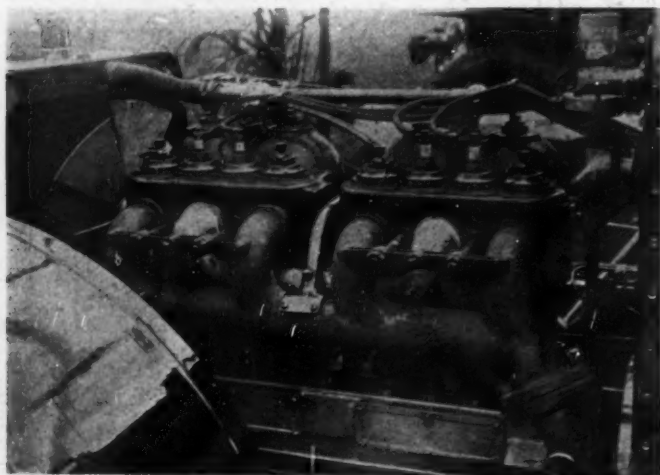
Hauling 500 lbs. dead load 200 yards.

1. Autocar, 24 h.p.; driven by A. H. Whiting..... :25 2-3
2. Frayer-Miller, 24 h.p.; driven by F. Lawwell..... :28 4-5
3. White Steamer; driven by J. Bell..... :44 4-5

#### OBSTACLE RACE.

1. Maxwell, 10 h.p.; driven by Louis Smith..... :16
2. Wayne, 50 h.p.; driven by A. L. Kull..... :16 1-5
3. Autocar, 24 h.p.; driven by M. J. Wolfe..... :16 3-5

One-mile record trial by Walter Christie, driving the 100-h.p. Christie front-drive racer. Time, 53 seconds.



SIDE VIEW 35-40-HORSEPOWER MOTOR OF THE AMERICAN.

#### THE ENGINE OF THE AMERICAN.

There is an attractive dash of foreign style in the general appearance of the 35-40-horsepower touring car manufactured by the American Motor Car Co., of Indianapolis, Ind., and exhibited at the open-air show. The bonnet has a flat top and the body lines are long and straight, giving the car a decidedly rakish look. The four-cylinder vertical motor has its cylinders cast in pairs; the bore is 4.9-16 inches and the stroke 5 inches. All the valves are mechanically operated and, all being placed on the same side of the engine, are operated by a single camshaft. The engine can be accelerated to a maximum speed of nearly 1,500 revolutions a minute. A sub-frame attached to the pressed steel main framing carries the engine and the sliding gear transmission. The clutch is a leather-faced cone working into the flywheel; the leather facing is backed by springs to give smooth starting and avoid jerks and jumping of the car when getting under way. Drive is by propeller shaft and bevel gears, the propeller shaft being fitted with two universal joints and running in ball bearings; claw clutches on the outer ends of the live rear axles engage with counterpart clutches in the hubs of the rear wheels. The front axle is of I-beam steel. Springs are semi-elliptic all round.

The regular service brakes are expanding rings on the rear hubs, while the emergency brake is a constricting band on a drum carried on the propeller shaft.

#### A RUNABOUT AT POPULAR FIGURES.

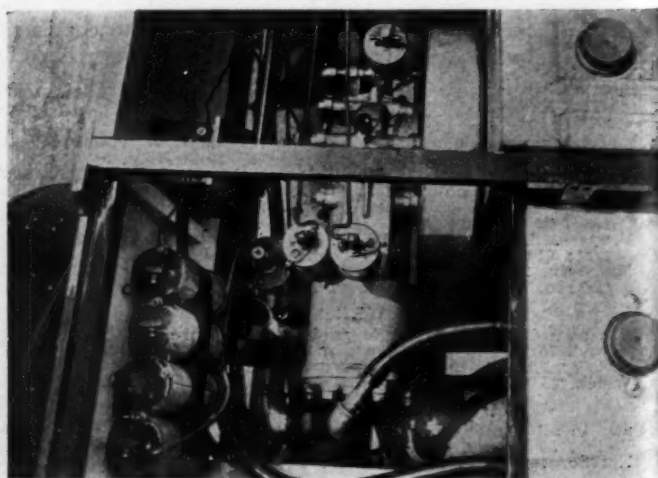
From time to time there are placed on the market automobiles designed with a view to filling the persistent "long-felt want" for a reliable small machine at a low price, as automobile prices go. One of the latest in this field is the Jewell \$400 runabout, manufactured by the Forest City Motor Car Co., of Massillon, Ohio,



THE NEW JEWELL MODEL B RUNABOUT.

and exhibited for the first time at the Empire City track open-air show by the Covell & Crosby Co., New York, Eastern agents.

The Jewell car follows, in a general way, the lines of the well-known buggy, having a piano-box body with straight dash and comparatively large wheels. The motor has a single cylinder of 4½ inches bore and 4 inches stroke, and is of the two-cycle type, the piston receiving an impulse at every revolution of the shaft. The motor is rated at 8 horsepower and is hung near the rear axle with the cylinder head pointing backward. On an extension of the crankshaft is mounted a two-speed and reverse planetary transmission which drives to a countershaft hung below the engine and carrying the differential gear. Final drive is by side chains the rear wheels, revolving on a dead axle of I-beam section steel. The front axle is also of I-beam steel. The engine is water-cooled, the tubular radiator being suspended back of the front axle. The frame is of rolled steel in a single piece, and to it the engine and other parts are attached by means of steel brack-



TOP VIEW OF MOTOR OF JEWELL RUNABOUT.

ets riveted in place. The spring suspension is on the three-point principle, there being two full elliptic springs in the rear and two inverted semi-elliptic springs disposed crosswise in front. Wheels are of wood, 32 inches in diameter, fitted with cushion tires. The wheelbase is 60 inches, the tread 46 inches, and the weight 700 pounds.



## WHAT DEAD HORSE HILL CLIMB SHOWED

By A. G. BATCHELDER.

WORCESTER, MASS., May 25.—Emphasizing in pronounced manner the great strides in automobile advancement, was the deduction which the practical man would make from a study of the score-sheet of the second annual climb of Dead Horse Hill. Once this grade would have tested severely the capabilities of the motor-driven vehicles; now the ascent is a jest for the lowest-powered car sold.

Spectacular indeed was the ascent of the Vanderbilt Darracq, but to the seeker of a staunch touring automobile the performances of the stock cars supplied more interesting material. Up they rushed—of 10, 20, 30, 40, 50, and 60 horsepower—and not a one faltered except a single luckless vehicle that veered into a gully alongside the road. Of course, some did the upward journey faster than others, but all met the task and the sum total told of the marvelous progress of a gigantic industry.

In point of speed the honors went to the same owner and the same driver as on the occasion of the first climb, managed so perfectly under the direction of Asa Goddard, now a Cleveland. And right here it might be remarked that President John Coghill of the Worcester Automobile Club directed affairs in the same vigorous vein as his predecessor, Chester Campbell assisting in the accumulation of an overflowing entry.

A year ago it was S. B. Stevens' Mercedes with Campbell at the wheel that excelled all others, its skyward mile being in 1:09. This time Mr. Stevens contributed the Darracq which won the Vanderbilt Cup, and it did the trick again in the free-for-all, the figures being 1:02. A heavy rainstorm late Thursday afternoon prevented the completion of the odds and ends of the too-long program, and Referee Speare gave opportunity the following

morning for the wind-up. Campbell sent the noisy craft upward in 1:01 2-5, and, after the regular events were concluded, in a time trial bounded the mile in 59 seconds.

But much of the substantial glory of the climb fell to the Stevens-Duryea "Big Sixes." One ascended in the "\$3,000 to \$5,000 class" in 1:14 3-5, thereby taking first place, and then another climbed in 1:10 in the heavyweight class, again a winner. This same car minus its tonneau later was clocked in 1:09 2-5, which meant second prize in the free-for-all.

Harding, pilot of the English Daimler which had triumphed over the Stevens-Duryea at Wilkes-Barre, had to assent to second honors in the heavyweight class, 2 seconds behind the "Big 6." Hilliard and the Napier that won last year's Mount Washington contest was a disappointed third in 1:14. The Darracq was a failure in this event, possibly because Campbell was anxious to reach too quickly his third and highest speed. He had a hit-and-miss ride in 1:34, which tells its own story.

The steamers had their innings in the middleweight class, in which L. F. N. Baldwin guided one to the summit in 1:06 4-5, the second place going to another Stanley driven by H. Ernest Rogers. Neither of these participated in the free-for-all.

Fred Marriott, the steam king of the Ormond-Daytona meet, on the day previous to the climb was credited with a fast effort in the Stanley car said to have been constructed for the Vanderbilt Cup race, though no entry for it has been filed yet. Marriott had some difficulty in keeping the car on the road—which has a perceptible crown—and his withdrawal from the events was reported to have been due to fear of running into the crowd. Since thousands of spectators did overrun the hill in a hazardous way, Marriott prob-



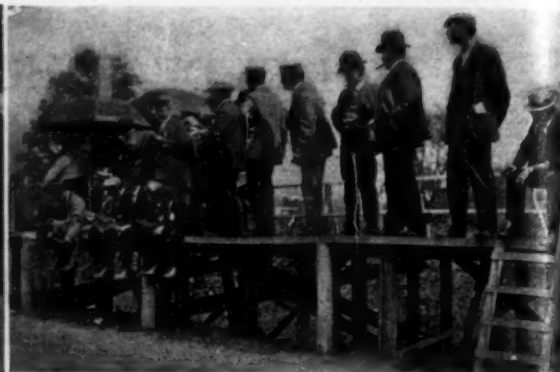
CAMPBELL AND THE VANDERBILT DARRACQ WHICH TOOK THE DEAD HORSE HILL HIGH-SPEED HONORS.



ROADS ABOUT WERE LINED WITH CARS.



CAMPBELL AND COGHLIN.



REFEREE SPEARE STUDIES THE PUZZLING PROGRAM.

ably exercised excellent judgment in not accepting the risk involved.

Three women were prominent in the proceedings, Mrs. H. Ernest Rogers, of Newton, particularly so through three times winning in her 10-horsepower Maxwell. Mme. Ella Des Roches drove her Franklin in one event, and Mrs. E. L. Oppenheimer rode in her Reo when it scored a winner. An injury prevented her from being at the wheel, as she had originally intended. Several women contented themselves with being passengers in the competing cars.

With many varied events on the card there were, of course,

Exactly how to police an automobile road contest except with a regiment or two of soldiers is a puzzle, for the onlookers will insist upon spreading all over the highway. One driver, in commenting on the incaution of the observers, said:

"I see people all over the road. I hope they will get out of the way in time. If they do not, well, I must run them down, for there are many more spectators who stand alongside the course and deserve the safety which they are entitled to by not going on the road as the others have done."

A roped road is one answer, but when the returns from a free race are confined to entry fees and program, the necessary ex-



NOW AND THEN THE SPECTATORS TOOK POSSESSION.

many winners. The Reo appropriated two firsts, and its time in another class was second best, H. J. Koehler and his Buick being the combination that had gone faster. Ray Owen had gained the idea that this particular Buick was not a regular stock car, and he had communicated to the referee his impression, along with the protest fee of \$10. For some reason or other—mayhaps, he forgot it—the driver whose car was protested at last accounts had not taken the pains to clear up the matter for the referee.

The Napier, English Daimler, Berliet, De Dietrich, Pope-Hartford, Corbin, Rambler, and Marmon were all first place cars, while close up were a dozen other makes not previously mentioned herein.



THE HIGH BANKS SERVED FOR GRANDSTANDS.

penses and prizes leave a small amount for such an extraordinary outlay.

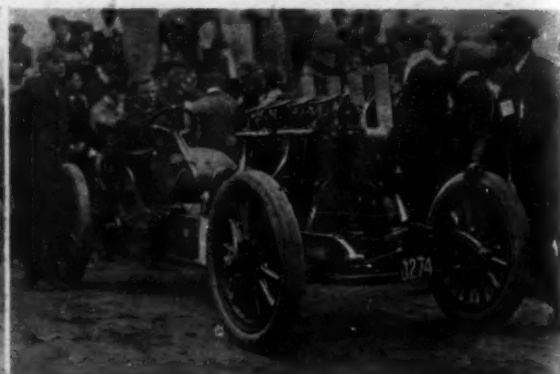
As is usually the case in a program which contains many stock events, Referee Speare had considerable to do in the way of passing upon protests; in fact, when this was written his work was still unfinished. According to the amateur rule of the A. A. A. it would seem that several who are credited with first places would lose their positions under a strict reading of the amateur definition. In the event for cars costing from \$3,000 to \$5,000, the English Daimler, listed at \$9,000, will probably be replaced by the Columbia of John Shepard, Jr., and there are other likely alterations in the official list.



R. E. TRAISSER AND HIS WINNING NAPIER.



BALD IN COLUMBIA.



THE FORMIDABLE-LOOKING AIR-COOLED PREMIER.



## THE AUTOMOBILE.



HANCOCK STARTING THE STEVENS-DURYEA "6."



HARDING, IN ENGLISH DAIMLER, AT ATTENTION.



F. E. WING AND MARMON WINNER.

## DEAD HORSE SUMMARY.

## WORCESTER CHAMPIONSHIP.

Make and driver	Cy HP	Time
Stanley, H. F. Grainger	2 20	1:31
Pierce, M. P. Whittall	4 45	2:01
Pope-Hartford, M. E.		
Dixon	4 25	2:15

## STEAM STOCK CARS.

Stanley, Baldwin	30	1:26
GASOLINE, STOCK, PRICE, \$850.		
Maxwell, Mrs. H. E.		
Rogers	2 10	3:31
Maxwell, Ralph Coburn	2 10	3:45 2-5
Crawford, Crawford	2 10	4:04 1-5

## AMATEUR; STOCK CARS: \$850.

Maxwell, Mrs. Rogers	2 10	3:23 2-5
Maxwell, Ralph Coburn	2 10	3:45
GASOLINE STOCK: \$850 TO \$1,250.		
Buick, H. J. Koehler	2 22	1:52
Reo, R. M. Owen	2 16	2:01 2-5
Buick, B. N. Crockett	2 22	2:11

\*Protested, claimed not to be stock car.

## AMATEURS; GASOLINE, STOCK:

\$850 TO \$1,250.		
Reo, Pope	2 16	1:58 2-5
Buick, M. P. Whittall	2 22	2:41
Reillance, W. H. Baker	2 22	4:04
GASOLINE, STOCK: \$1,250 TO \$2,000.		
Buick, B. F. Crockett	2 22	2:35 1-5
Crawford, Weatherbee	4 24-28	2:55 1-5
Maxwell, Stockbridge	2 16	3:25 1-5
Queen, R. Driscoll	4 26-28	ditched
AMATEURS; STOCK: \$1,250 TO \$2,000.		
Reo, Thomas	2 16	2:11 2-5
Crawford, Poor	4 24-28	3:12 1-5
Franklin, Mme. Des		
Roches	4 12	3:35

GASOLINE, STOCK: \$2,000 TO \$3,000.		
Pope-Hartford, Grady	4 20-25	1:50
Maxwell, Kelsey	4 35	1:57 2-5
Columbia, Barrett	4 24-28	2:05 1-5
AMATEURS; STOCK: \$2,000 TO \$3,000.		
Marmon, Emerson	4 30	2:26 2-5

## GASOLINE OR STEAM, STOCK:

\$2,000 TO \$3,000.		
Rambler, Wilson	4 35	2:15 4-5
Marmon, Wing	4 30	2:24 2-5
GASOLINE, STOCK: \$3,000 TO \$5,000.		
Stevens-Duryea, Dur-		
yea	6 50	1:14 3-5
Columbia, Bald	4 35	2:00
Thomas, Miller	4 50	2:04 3-5
Pope-Toledo, Elliott	4 40	2:05 2-5

## AMATEURS; STOCK: \$3,000 TO \$5,000.

Eng. Daimler, Harding	4 35-40	1:16
Columbia, J. Shepard		
Jr.	4 40-45	1:54 4-5
Pope-Toledo, Elliott	4 35-40	2:15
Pierce, Whittall	4 45	ditched
GASOLINE, STOCK: \$5,000 AND OVER.		
Napier, R. E. Traiser	6 60	1:37 4-5
Fiat, E. Hill, Jr.	4 50	1:38 2-5

## AMATEURS; GASOLINE: MORE

THAN \$5,000.		
De Dietrich, Harding	4 80	1:19 1-5
Eng. Daimler, Stevens	4 35-40	1:24 1-5

\*Protested account being stripped.

## GASOLINE CARS, HEAVY-WEIGHT.

Stevens-Duryea, Rem-		
ington	6 50	1:10
Eng. Daimler, Harding	4 35-40	1:12
Napier, Hillard	4 80	1:14
Pope-Hartford, Grady	4 25	1:28 1-5
Darracq, Campbell	4 80	1:34
Columbia, Maxim	4 24-28	1:36

## CARS 851 TO 1,432 POUNDS:

Stanley, Baldwin	20	1:06 4-5
Stanley, Rogers	20	1:13 2-5
Columbia, Maxim	4 24	1:36
Buick, Kohler	2 22	1:43 4-5

## STOCK CARS, 551 TO 851 POUNDS:

Maxwell, Mrs. H. E.		
Rogers	2 10	3:02
Maxwell, Coburn	2 10	3:13

## CARS WEIGHING OVER 2,204

POUNDS:		
Darracq, Campbell	4 80	1:01 2-5
Berliet, Gray	4 60	1:16
Rambler, Wilson	4 35	1:58 2-5

## FREE-FOR-ALL CLASS:

Darracq, Campbell	4 80	1:02
Stevens-Duryea, Han-		
cock	6 50	1:09 2-5
Napier, Hillard	4 80	1:13 2-5
Premier, Moore	8 100	1:37

## OPEN TO ALL GASOLINE CARS:

Darracq, Campbell	4 80	1:02 1-5
Berliet, Gray	4 60	1:19 1-5
De Dietrich, Downey	4 80	1:23 2-5
Rambler, Wilson	4 35	2:06

## SPECIAL RUNABOUT CLASS:

Corbin, Markel	4 24	1:57 2-5
Corbin, Kimball	4 24	1:59 4-5
Fraye, Miller, Burrage	4 24	2:42

## MOTOR CYCLES:

Indian, Kellogg	1 1/2	1:15 2-5
Indian, F. Hoyt	1 1/2	1:17
Marsa-Metz, A. Hoyt	1 1/2	1:17 3-5



A NOTABLE WINNER: POPE-HARTFORD.



B. W. GRAY AND THE BERLIET.

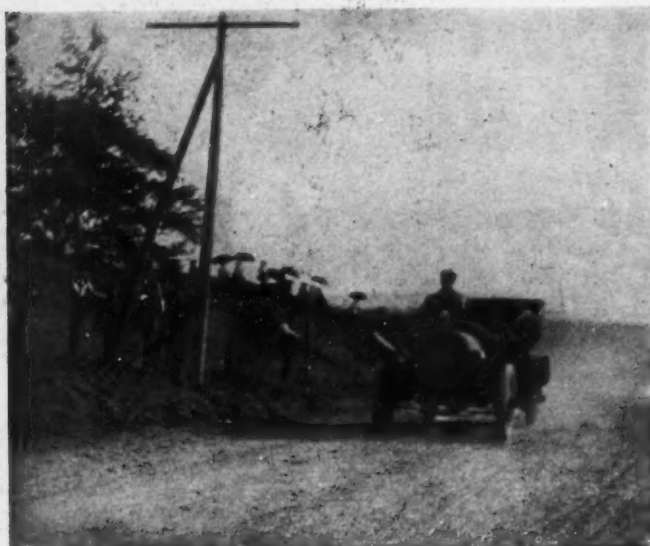


A RAMBLER THAT SUCCEEDED.

## APPERSON WINS INDIANA CLIMB.

INDIANAPOLIS, IND., May 24.—Up the smooth but dusty Glen Valley Hill, forty-two motor-driven vehicles climbed this afternoon, some to victory, others to defeat, but all gamely, and no car made a record of which it need be ashamed.

There was some delay in getting started. A yokel midway up the hill hung his coat on the wires, and it was not until after 3 o'clock that the starter announced: "Car coming!"



"JAP" CLEMENS, A NATIONAL GLEN VALLEY CLIMBER.

Those at the top gathered on the hillsides that formed a natural amphitheater, strained their eyes to see who was coming, and a few seconds later Edgar Apperson shot over the tape in a 40-horsepower Apperson. The time was 31 1-5 seconds, a lively pace for the first contestant to set, for none of the others in all of the events was able to touch the mark.

Unfortunately it was impossible to get the hill for exclusive use, and frequently it was necessary to hold a car for an instant while flagmen stopped some farmer and his slow-going horses before they could block the right of way. But the farmers, without exception, were good natured, and in no instance refused the request to wait a few minutes. Summary:

### FREE-FOR-ALL CONTEST FOR OWNERS.

- |  |         |
|--|---------|
| 1. Apperson, 40 h.p.; Edgar Apperson, driver ..... | :31 3-5 |
| 2. Buick, 20 h.p.; W. L. Carr, driver .....        | :41 2-5 |
| 3. National, 35-40 h.p.; Wall, driver .....        | :42     |

### RUNABOUTS, WEIGHING UNDER 1,432 POUNDS.

- |  |         |
|--|---------|
| 1. Franklin, 12 h.p.; S. W. Elston, driver ..... | :35 3-5 |
| 2. Franklin, 12 h.p.; Harry Stutts, driver ..... | :53 4-5 |
| 3. Cadillac, 10 h.p.; Davidson, driver .....     | :57 4-5 |

### RUNABOUTS, WEIGHING 1,432 TO 2,204 POUNDS.

- |  |         |
|--|---------|
| 1. Premier, 16 h.p.; Waltman, driver ..... | :42     |
| 2. Buick, 20 h.p.; Whittle, driver .....   | :42     |
| 3. Premier, 24 h.p.; Brown, driver .....   | :43 1-5 |



STARTING FROM BOTTOM OF DEAD HORSE HILL.



THOMAS AND REO TOP OF DEAD HORSE HILL.

### TOURING CARS, WEIGHING 1,432 TO 2,204 POUNDS.

- |  |         |
|--|---------|
| 1. Stoddard-Dayton, 30-35 h.p.; Frank L. Moore, driver ..... | :36 2-5 |
| 2. Buick, 22 h.p.; Whittle, driver .....                     | :46     |

### TOURING CARS, WEIGHING OVER 2,204 POUNDS.

- |   |         |
|---|---------|
| 1. Marmon, 30 h.p.; Howard Marmon, driver ..... | :40 4-5 |
| 2. National, 35-40 h.p.; Clemens, driver .....  | :45 4-5 |
| 3. Peerless, 28-30 h.p.; Stutts, driver .....   | :47 2-5 |

### STOCK CARS, LISTED \$850 AND UNDER.

- |   |           |
|---|-----------|
| 1. Leader, 16 h.p.; Cherry, driver .....  | :50 3-5   |
| 2. Maxwell, 10 h.p.; Willis, driver ..... | :1:00 3-5 |

### STOCK CARS, LISTED FROM \$850 TO \$1,500.

- |   |         |
|---|---------|
| 1. Buick, 20 h.p.; Whittle, driver .....    | :37 2-5 |
| 2. Premier, 16 h.p.; Wellsman, driver ..... | :40 3-5 |
| 3. Leader, 20 h.p.; Cherry, driver .....    | :42     |

### STOCK CARS, COSTING \$1,500 TO \$2,000.

- |  |         |
|--|---------|
| 1. Franklin, 12 h.p.; Elston, driver ..... | :39 1-5 |
| 2. Lambert, 30 h.p.; Lambert, driver ..... | :42 4-5 |
| 3. Premier, 20 h.p.; Hammond, driver ..... | :43 3-5 |

### STOCK CARS, LISTED FROM \$2,000 TO \$3,000.

- |  |         |
|--|---------|
| 1. Stoddard-Dayton, 35 h.p.; Moore, driver ..... | :32 1-5 |
| 2. Marmon, 30 h.p.; Howard Marmon, driver .....  | :36 3-5 |
| 3. National, 35 h.p.; Clemens, driver .....      | :38 4-5 |

### STOCK CARS, COSTING OVER \$3,000.

- |   |         |
|---|---------|
| 1. Apperson, 40 h.p.; Edgar Apperson, driver .....  | :33     |
| 2. Peerless, 28-30 h.p.; Harry Stutts, driver ..... | :46 2-5 |



MRS. ROGERS EN ROUTE UPWARD IN MAXWELL.

## POPE-TOLEDO WINS PRINCETON CLIMB.

PRINCETON, N. J., May 25.—F. Brooke, in a 35-horsepower Pope-Toledo, was the fastest performer in the Princeton Automobile Club's hill climb to-day, conducted up the road that runs between the canal and the campus, with a grade of about 5 per cent. The winner's time was 58 3-5 seconds; S. L. Crawford did the trip in 1:03 with an Indian motorcycle, and S. Morton, 16-horsepower Locomobile, was credited with 1:25.



## BALL BEARINGS—GOOD, BAD, AND INDIFFERENT

By HENRY HESS.\*

LONG ago—longer than I like to contemplate—I was introduced to ball bearings as a rider of the high bicycle. That bicycle had plain cone bearings, as the makers thought them better than ball bearings. Years later I was fortunately preserved from embarking in the business of making bicycles by the failure of the parties who were supposed to swing the financial end. The preparation for that venture naturally included the ball bearing. Again a kindly fate intervened in the shape of a drastic turn down of my propositions, as "old, old, very old," by one of our leading and still existing bicycle concerns, tempered by an acknowledgment of the fact that a contemplation of then existing ball and roller bearings made it a pardonable conclusion that instruction in first principles was much needed. For years that settled ball bearings with me; yet now again ball bearings are with me eating and drinking, waking and sleeping.

### Principle Upon Which the Ball Bearing Is Built.

So long as the surface of the ground and the bottom of a plank are parallel there is no tendency to either press the rollers between, apart or together, no matter what the load that is carried. Now these two parallel surfaces may be considered as circles of infinite radius. Shorten up the radii of the two surfaces, strike the circles from a common center, fill the space between with rollers or balls, and we have the roller bearing of to-day in general; now why should there be any pressure between the adjacent rollers or balls due to and therefore proportional to the load? Yet the Patent Office, the woods and Wall Street are full of just such constructions and schemes. Try a simple experiment with any bearing—separate the balls at the top, bring them together at the bottom and press down as hard as possible on the inner race! There will be no wedging apart whatever of the bottom balls nor a bringing together of the top ones.

When the Deutsche Waffen und Munitionsfabriken decided that they had been sold a gold brick by the plausible gentleman who exchanged misinformation as to ball bearing design for a quantity of coin, they tried out all sorts of shapes. It was found that the friction was least when balls rolled between surfaces of straight-line cross section with only one point of contact with each surface. Next in order came similar surfaces with two and three point contact. For four-point contact the friction increase for similar loads was very marked, no doubt because of the difficulty in producing and maintaining under load the correct relation of the contact surfaces and the centers of revolution of the balls individually and as a planetary system around the shaft center.

Taking up the load-carrying capacity and friction together, it was found that the friction was lowest when the balls were supported in races having straight-line cross sections and with a single point of contact with each race, such point of contact lying in a plane at right angles to the axis of the shaft. It was further found that for a correctly arranged three-point bearing, again having straight-line cross sections of the race, the friction was about 50 per cent. higher and the load-carrying capacity about the same. With four-point contacts and straight-line cross sections the carrying capacity was also found to be as before, but the friction considerably higher than theoretical considerations indicated. Experimenting with races of different curvature, it was found that the carrying capacity increased with such curvature. Though the stressed particle in the race is the same whether the race have a straight-line or a curved cross section, there is still an important difference. Failure of such particle shows itself, first, by a flaking out, as is characteristic of practically all materials of any hardness. In the straight-line cross section this stressed particle can be easily flaked out,

whereas in a curved cross section there is a wedge of material at either side which supports this stressed particle so that it cannot be forced out. The greater the curvature, that is to say, the smaller the radius of curvature, the better will this stressed particle be supported and consequently the greater will be the carrying capacity.

### Curved Section Must Never Depart from Its Radius.

As in every mechanism the weakest link in a chain fixes the strength of the entire element, so it is in a ball bearing. If for any reason whatever the general curved cross section is at some place converted into a straight-line section, the carrying capacity of the bearing will be governed by such straight-line section, provided that is brought under the load. Many forms of bearings have been devised in which the balls are filled through side openings, all of which involve such change in cross section and consequently a lessening of the load-carrying capacity. The only exception is a construction due to Riebeck, in which the filling opening is confined to one race only and the continuity of the race restored by a suitable clip in the larger size and a filling screw in the smaller size. In this type the filling opening would be, by means of keyways or pockets and keys or screwheads on the race, retained at the unloaded side of the journal, that is to say, until some chauffeur or repairman saw fit to knock off such key of screwhead. Manifestly, in that type of bearing in which a filling opening is cut into both races, one or other of these must necessarily, once in each revolution, pass under the load and so limit the carrying capacity of the bearing.

### Complete Unit Bearing Inviting Field for Inventors.

The general idea of making a ball bearing that will handle as a complete unit has proven a very inviting field to many inventors after the success of the original type was demonstrated. Consequently the filling methods, chiefly from the side, are many and various. All, however, involve an interference with correct action. Some have carried the filling cut tangent to the base of the race, or ball track, and thus form an edge at this point on which the balls strike or catch as they pass. Rounding over this edge does not do away with the difficulty, although it makes the catch less prominent when the bearing is rotated slowly. Bearings of this type, run at high speeds, will show that the balls catch at the opening and then bounce and strike the race quite a sharp blow, then rebound again, striking another blow, until this action gradually dies out in about one-third of a circumference. I have seen many such bearings in which this action was plainly shown by depressions sharply defined close to the filling opening and gradually dying further along.

Other inventors sought to avoid the loss in carrying capacity due to the side filling opening by not carrying this quite down to the base of the race way or ball track and relied on springing the outer race outward and the inner race inward while forcing in the last ball. Naturally this, in hard material, results in a crumbling of the edge over which the ball is forced close to the actual track, or, if the material is not so hard, some of it is forced inward and forms a projection that in turn interferes with the action of the balls and produces a striking point, resulting in phenomena similar to those already mentioned. With all such unclosed side-filling openings there is, of course, always a more or less pronounced tendency for a ball to come out under any intentional or accidental endwise load.

One inventor has sought to prevent this tendency of balls to come out through the filling opening by inclining the filling opening in the two races in opposite directions so that, to fill, the races must be slightly rotated with reference to one another. That unquestionably attains the end sought, but does not prevent the catching of the balls at the inner edges of these openings. An-

\*A paper read before the first general meeting of the Society of Automobile Engineers in New York.

other inventor has recognized this bad feature of the balls catching at the filling openings and has therefore on one side cut away his stock in both races almost to the bottom of the race and fills in his entire series of balls by pressing them through the annular opening thus formed slightly narrower than the diameter of a ball. That device, however, brings in all of the bad features of the already described similar one-ball-at-a-time side-filling opening. Further than that, it follows that if a bearing is assembled by end-thrust in one direction, an end-thrust in the opposite direction will again dismember it and so render a bearing of that character totally unfit for such places as automobile hubs, behind the bevel pinion or gears, or wherever end-thrust may be present.

#### Friction, Destructive Wear, Causes and Remedies.

The bearing invented by Riebe was mentioned before and is the old D. W. F. full type. That bearing had all of the faults common to any full type of bearing, but avoided most of those with side-filling openings due to its side-filling opening being confined to one race only so that it could be located at the unloaded side of the journal and so do away with the weakening effect. As before mentioned, the edge interference of the filling opening was also done away with by a restoration of the continuity of the race by a filling piece. So long as load is uniform, as speed is uniform, as the load is not eccentrically applied and as neither shaft nor housing defects, there will be no interference of the balls with one another. If these various conditions are not fulfilled the balls will interfere with one another with consequences that become more and more serious as loads and speeds are increased. Such consequences show themselves not only in an increase in friction, but also by a relatively early destruction of balls and races. By elastically separating the balls all of these various interferences are prevented. Although the introduction of such elastic separators necessarily lessens the total number of balls, yet the actual carrying capacity of the bearing is not decreased, because the full capacity of the balls may be realized and they may therefore be loaded to a considerably higher point and run at higher speeds than is possible with the full type except under conditions that are ideally perfect, but that are very rarely indeed attained in actual practice. Making these elastic separators correspond to about a ball diameter permitted a construction doing away entirely with all side-filling openings and so getting races of absolutely uniform cross section with no weak point and no interfering points anywhere in their circumference, therefore doing away also with all necessity for paying any attention whatever to the direction of the load or for in any way angularly fixing a race with reference to such direction. This latest improvement in ball bearings may be broadly characterized as a ball bearing having absolutely unbroken races of similar cross section on each side of a plane taken at right angles to the axis of the shaft with balls elastically separated and capable of acting individually without material interference under such adverse conditions as deflecting shafts or mountings, or sharp load or sharp speed variations, having no filling openings or cuts of any character and forming a single complete unit when assembled. But not only must a ball bearing be properly designed as to form, but the material also must be properly selected. All of the old ideas prevalent as to bearings and to wear must be dropped.

An ordinary or plain bearing changes size by a gradual wearing away of the particles. Such wear is not detrimental unless carried too far so that the play, or looseness, becomes too great. Such looseness may then be taken up by some one of many well-known and good devices for that purpose. In a ball bearing, however, there is no such thing as a wear, unless in the presence of sharp cutting grit, which, needless to say, should always be excluded. If the bearing is made of hard material and overloaded there will be a destruction of the surfaces of both balls and races by the flaking out of small particles of material. When once this has started it goes on at an increasingly rapid rate. If the material of the balls or races is too soft there will be a condensation and, of course, also a loss of correct shape, so that, instead of the original point contact, there will be surface contact and the rolling action be converted into a sliding action. The bearing then ap-

proaches the conditions of a plain sliding journal with entirely insufficient supporting surfaces. A compensation for wear in a ball bearing is an impractical matter, unless new surfaces could be brought into play. No conceivable, or at least no form of bearing heretofore brought out, can have or has such adjusting devices. It follows logically that the material of the ball bearing should be so selected that it will have no appreciable wear or change of shape, at least during the amortization life of the machine in connection with which it is employed. That necessitates the use of exceedingly hard materials, which at the same time must be tough. A very high degree of finish, the production of which at the same time does not interfere with the truth of the surfaces, is also a prime requisite, since even small roughnesses will soon be battered down by the rolling action of the balls and will result in an early destruction of the bearing. Carefully conducted experiments have shown that the difference between a mirror-like polish and a grinding finish that would be called very good indeed by high-class mechanics, is as three or four to one in the life of a bearing under similar conditions of a load, speed and material.

Granting that a bearing of proper shape and of proper material is employed, yet selection must also be governed by experience of a carrying capacity of various sizes of balls in connection with various race diameters and conditions of load and speed or shock peculiar to various mechanisms. There is no magic whatever, even in the initials D. W. F. or H. B. stamped on a bearing, that will make a 500-pound bearing stand up under 5,000-pounds load, or that will make a bearing that is good under a uniform load stand up under a similar load on, for instance, a railway axle or in the hub of an automobile.

#### Capacity for Enduring End Thrust and Heavy Work.

The end-thrust carrying capacity of two-point annular bearings is frequently doubted. When the German company first made up this bearing they, from purely theoretical reasons, assumed that they were not suited for receiving end-thrust and confined their recommendations to radial loads only. A series of experiments demonstrated to their very great surprise that the bearings not only would carry end-thrust, but also a very considerable amount. In fact, it was found that in what they call their light and medium-weight series one pound of end-thrust was the equivalent of between three and four pounds of radial load; that is to say, that a bearing that was rated at 1,200-pounds radial load capacity could safely take end-thrust alone up to 300 or 400 pounds. A satisfactory theoretical explanation of this peculiar fact has not yet been found, but the fact itself has been demonstrated since in practice by many thousands of bearings.

One of the hardest worked journals in any piece of mechanism is on the crankshaft of a gasoline engine. That ball bearings should stand for service such as this is little short of marvelous, yet that they do so, at least as regards the D. W. F. or H. B., is sufficiently proven by the experience of such concerns as Hotchkiss, which uses them, not only on the main bearings, but also in the connecting rods; by Daimler's Mercedes, who has employed them for their 70-horsepower racing machines, and then for their 70-horsepower regular cars, and now also uses them for their regular 40-horsepower touring machines. Besides these concerns mentioned, many others use these bearings on the crankshafts, more particularly at the end bearings, among whom are C. G. V., Bollee and many others.

Now I can say that until quite recently I was personally about as sceptical as well could be regarding the merits of ball bearings for heavy work—not bicycles and sewing machines. While engaged in building machine tools in Berlin, I was compelled by a large customer to put ball bearings into the steps of heavy projectile turning lathes for him, he taking the responsibility for the make specified and used by him also under 8-inch naval gun-mounts with high angle fire. That experience prompted further use, and finally my resignation and return to my native shores, the proud possessor of the privilege of making my compatriots share with me in the benefits of a full knowledge of D. W. F. ball bearings.



### PURDUE TESTING PLANT.

LAFAYETTE, IND., May 28.—Realizing the importance of the automobile from both commercial and pleasure standpoints, Purdue University added an automobile course of instruction. Although it has been in existence only a short time, it has already proven to be one of the most popular courses offered by the university, which is a state institution. At present the plant for the testing of automobiles is located in the locomotive engineering laboratory, and is a part of that school. It was designed some time ago by W. F. Goss, head of the Purdue Schools of Engineering; W. O. Teague, and Prof. J. R. McCool, the construction of the plant being similar to the lines followed in the locomotive testing plant.

An automobile of any type can be mounted on the mechanism that constitutes the testing apparatus, and while thus mounted can be operated, its driving wheels being carried by the supporting wheels of the plant, the wheels being upon an axle which revolves in fixed bearings. In such a position the automobile is held by a connection with a traction dynamometer located at the rear of the automobile. The supporting wheels of the plant are turned against a resistance, the value of which may be varied as desired, and whatever the resistance may be it appears as a stress on the drawbar, and the resistance is regulated by a friction brake. Thus an automobile may be made to pull as little or as much on the dynamometer as desired, running under either a light or heavy load.

In testing, the horsepower delivered is equal to the pull upon the dynamometer in pounds, multiplied by the space passed over in one minute by the automobile driving wheel divided by 33,000, the space passed over being found by determining the number of revolutions of the supporting wheel, which is of fixed diameter.

So complete is the testing plant that a friction brake on the axle of the supporting wheels absorbs the energy delivered while motor-driven pressure blower forces air through adjustable piping for cooling the radiators of either gasoline or steam cars. The plant has met expectations.

### CONNECTICUT'S SHORE ROAD.

NEW LONDON, CONN., May 21.—To automobile tourists the plans of the Connecticut highway commissioner, J. A. MacDonald, are of peculiar importance. He has been for several years engaged on a plan to complete, in as short time as possible, two main trunk lines across the State—one along the Long Island Sound shore, and the other branching off from New Haven and running north to Springfield, Mass. The shore route, however, is the more popular for tourists going east to the watering places, to Newport, New London, Providence or Boston. The work done this spring has put this road in better condition than it has ever been, and with the exception of a few short stretches in the vicinity of Greenwich and near the Connecticut river, this shore road affords enjoyable riding, with almost a constant view of the waters of Long Island Sound. Only the inadequate facilities for ferriage over the Connecticut river are liable to prove the least troublesome, though the United States steamboat inspectors from New London recently ordered changes to be made in the ferryboat running between Saybrook and Lyme which will rather enlarge the accommodations on that small craft. With a new and larger ferryboat now plying across the Thames river at New London, the tourist will be fully accommodated at quarter-hour intervals. Once across the Thames river, the tourist has an uninterrupted stretch of good road to Providence, 64 miles. Short stretches and hilly sections between New London and Stonington which have been in poor condition for years, were taken in hand by the highway department this spring and local automobilists report them in first-class shape. Touring over the shore route has opened earlier than usual, according to the statements of hotelkeepers in this city, who say they never before accommodated as many touring parties during April and early May as this year.



AUTOMOBILE TESTING MECHANISM IN THE ENGINEERING LABORATORY OF PURDUE UNIVERSITY, LAFAYETTE, IND.

# AMERICA'S MOST POPULAR TOURING COURSE

By ROBERT BRUCE.

**O**PINIONS will naturally differ widely upon any subject of this kind, but probably the consensus of opinion among American autoists would favor as America's most popular touring course the east side route along the Hudson river between New York and Albany. This trip is approximately 160 miles and rich in point of scenic and historic interest.

However, this is only one of the two complete highway systems which skirt the Hudson between the Metropolitan district and the capital city and its near neighbor, Troy. But it is the most used and undoubtedly the better thoroughfare of the two, in great part the old Albany post road. When the railroad was built through to the North and West, it made the horse-drawn coach service unprofitable for long up-and-down trips. Of the old-time taverns some have survived, and are now entertaining automobilists as they did the less-fortunately mounted travelers of long ago.

## The Advantages of the East Side Route.

The East side line divides almost equally at Poughkeepsie, the largest intermediate city, where will be found by far the best facilities on the route. Most of the other towns and cities provide comfortable accommodations, both in respect to hotels and garages. Signboards, while numerous, are not yet of a regularly complete order, compelling one to keep his own lookout, more or less, from beginning to end. However, with a little experience

it becomes an easy matter to distinguish the Post Road from the innumerable short lines that cross it. Ordinarily a much more difficult task is to pick out the one cross line necessary to reach some particular place.

The situation of New York City on an island, whose most convenient exits are across the Harlem river into the "V"-shaped district between the lower Hudson and the nearer edge of Long Island Sound, has been of special advantage to the East side route. Though equally interesting both scenically and historically, the West side is separated from the largest center of population all the way by the Hudson river, crossed only by ferries, the results of which are seen in the more sparsely-settled country and the much smaller rail and road travel. Along the East bank are clustered scores of country seats which gradually improving roads and better automobiles are bringing closer to New York.

When, two or three years ago, the proposition was much agitated to construct a through highway from the Atlantic seaboard to the head of Lake Michigan, Colonel John Jacob Astor offered to subscribe \$10,000 toward the work of the New York-Chicago Road Association, provided that the route of the proposed highway should be carried up the East side instead of up the West

side, as then recommended by that association. For the time being that project dozes, but it will undoubtedly be revived and put through in time.

## A Natural Gateway to the West.

The Hudson river route will undoubtedly be a factor also in shaping even the transcontinental highways of the more distant future, and all the influence of New England will be in favor of it. By means of various popular routes most of its territory is tributary to the Hudson river valley. Travel and traffic between these six States and the West stand in precisely the same relation to the river as travel and traffic from New York City; it must cross at some point or other.

Pleasure travel, like established commerce, finds its natural way to the West through the Albany and Troy gateways. Above, the Adirondacks form a natural barrier; below, the Catskills partially shut off the way. But through the Mohawk valley, central and western New York to Buffalo and beyond, there is practically a water level across northern Ohio and northern Indiana to the head of Lake Michigan. Nature evidently intended that this should be the way of ways between the East and the West.

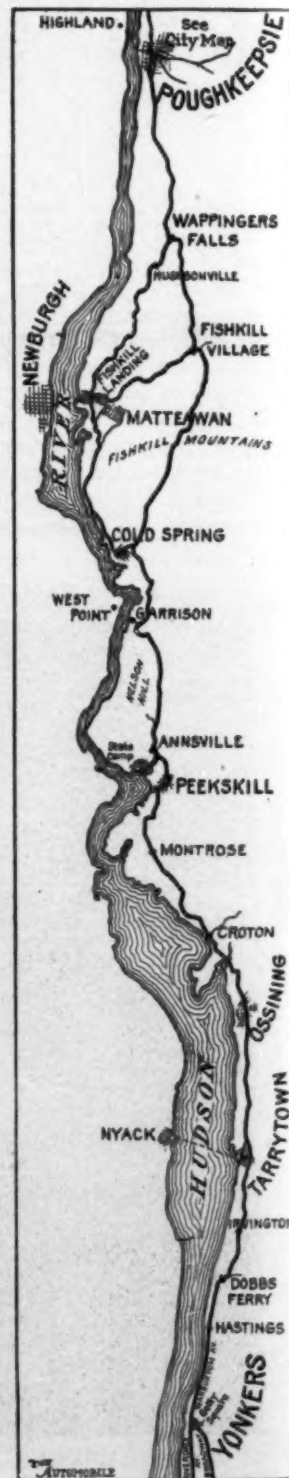
Most of the sight-seeing on the East side up-trip is usually done between the Harlem river and Peekskill, on the West side down-trip between Newburgh and New York. The middle third will average fine driving, with fewer places of historic note, but plenty of interesting scenery. The upper third is comparatively flat and unattractive, mostly thinly-settled farming country. From New York to Albany, or from Albany to New York, the Hudson is sometimes close by, but usually the through routes follow the roads along the higher bank.

End-to-end tours in either direction are frequently made in one day, but this is difficult to do when much time is given to sight-seeing. For convenience, the Hudson river valley is often divided broadly into the (1) lower, (2) middle and (3) upper districts; and these may ordinarily be considered as about equal with respect to time and mileage. Side trips, of which there are very many, must, of course, be calculated separately.

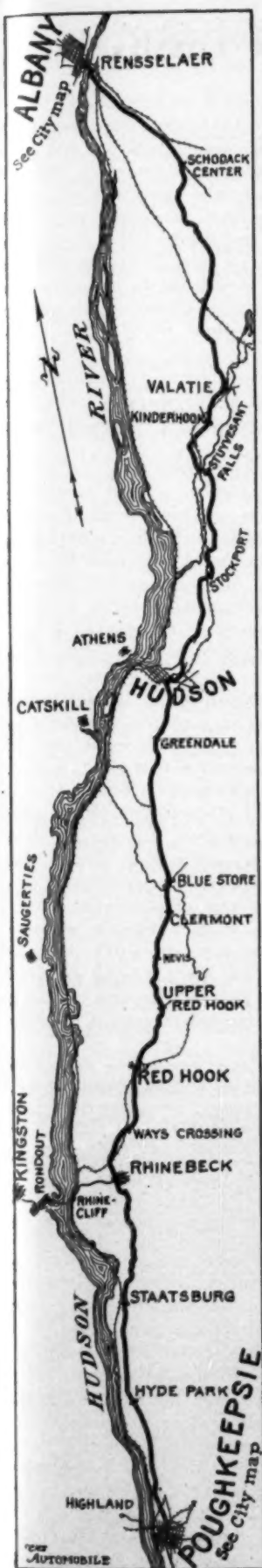
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### Safety of the Course.

Considered as a whole, automobiling through this section—which is literally the front door of the Metropolitan district—is as safe as any other portion of equal area in the United States; and yet accidents of various kinds are reported at more or less frequent intervals. In most cases these are due to personal unfamiliarity of the operator with the character of the country, especially strangers making their first tour this way. Aside from a few places in the Highlands between Ossining and Fishkill, the grades along the East side of the Hudson are not bothersome, and may be taken with perfect safety by properly equipped touring cars. Nelson Hill, just above Peekskill, the worst on the route and the special dread of former years, has been entirely eliminated by the new road built around the east side of it; and everything else on the entire line can be ascended or descended practically without trouble. Stalled cars, except from breakage or lack of fuel, have become a rarity on the whole of this route.

### Special Dangers to Avoid.

Observation and experience extending over a considerable period of time have led to the conclusion that the special dangers noted in the following paragraphs are chiefly to be looked for in the trip up or down the Hudson river.

1. **Grade Crossings**—There are innumerable and at times particularly atrocious, mostly over railroad tracks, but trolley tracks are growing rapidly in number. The thoroughfares up some distance from the water-front, and usually on higher ground, do not have as many grade crossings as the lower roads. This fact is a boon to through travel, but it is to be reckoned with every time the autoist uses any one of the ferries between Nyack and Albany.

The grade crossings most to be feared are naturally the main tracks of the New York Central railroad, which are literally covered with traffic at all hours of the day and night. Trains running frequently at sixty miles or more per hour are likely at any moment to sweep around a curve, perhaps not over a quarter-mile away, and in a twinkling of an eye pick up anything that may happen to be crossing the tracks. Most of these crossings are guarded by a "tender," and some of them are equipped with gates; but these

are only a semi-security. Particularly in the vicinity of New York City, where suburban trains add to the volume of the traffic, there is practically no assurance of safety, and the best results come from the exercise of good judgment at all times.

2. **Steep Descents to the River Front**—The fact that the best route along the East side of the Hudson follows an upper course somewhat back from the river, rather than the actual waterfront, necessarily creates a number of steep descents in order to reach the many points which nestle along the Hudson, especially in the suburban district. If an autoist not well acquainted with the route chances to turn into one of these steep byways unawares, he is much more apt to lose control of his car than under any other circumstances of his trip.

These steep roads are usually doubly dangerous because they are not only short, but because they come to an abrupt end at the water's edge, in the meantime crossing a network of tracks. In two or three instances parties who have lost their way at night have been brought to grief on the railroad tracks.

In June, 1904, a chauffeur lost his way and a party of five was carried down one of the steep grades near Kingsbridge. The machine slid down the hill at a terrific pace to the edge of the railroad tracks, which were theoretically protected by gates; but an automobile making such a descent cannot be stopped by anything of that kind. A passenger train was coming down on the northbound track and a fast freight going up on the southbound track. After breaking through the gates, the heavy car stopped with locked brakes on the northbound track, when the occupants jumped out and succeeded in saving their lives by lying down between the rails, while the two trains smashed the car into a shapeless mass. At very few of these places is the river or the tracks in view before one is actually upon them.

3. **Collisions**—For most of the 76 miles between New York and Poughkeepsie the way is deeply shaded by rows of large trees on either side of the road. For many miles, too, electric lights are scattered along this course; so that the way is not clear even on moonlight nights, while on dark nights every caution is necessary. In making this run by night particular care should be taken to avoid collisions as well as turns onto wrong roads.

**A Roadside Danger**—The entire Hudson river district is subject to frequent heavy rainstorms, with the result that gullies, some of them very deep and rough, are frequently worn across the road in a very short time. This is particularly the case along the actual waterfront. When a severe storm has worn bad places on the hillsides above the river, a sudden and unexpected drop of the front wheel into one of these gullies might cause the car to "turn turtle," and the end of that operation might find operator and his passengers at the bottom of a steep ravine or along the railroad track at the bottom of the grade.

When these gullies have worn down in an unusual manner, the local authorities frequently erect what are supposed to be guard posts, one post on either side of the gully and a board nailed between them. Once in a while these connected posts will be set in one or two feet from the normal outer edge of the road. Of course these are easily enough avoided in the daytime or by a horse at night, but an automobile running at speed in the twilight or after dark might have as a result one of the most unhappy collisions possible. Especially if the shock of contact with the post should overturn the car, it would be likely to fall in the down direction and make an exceedingly rough landing.

A prominent citizen of Scarborough-on-the-Hudson about a year ago appealed to the Automobile Club of America to call the attention of its members and the touring public generally to the exceedingly dangerous corner on Broadway (Albany post road) in Scarborough, a small residence place between Tarrytown and Ossining. This corner is in front of the Presbyterian church, where the Briarcliff road and the road to the Scarborough railroad station intersect Broadway. The approach to Broadway is masked on the one hand by a high brick wall, and the road is downgrade, and on the other hand by a sharp curve. Several serious accidents have narrowly been averted at this point. Tourists will do well to observe the warning signs.

## SOME REQUIREMENTS OF CARBURETER DESIGN

By E. T. BIRDSALL, M.E.\*

EVER since the idea of using a vaporized or gasified liquid fuel in the internal-combustion engine was suggested, the device for preparing the fuel for use in the engine has been a subject for much thought and study. Numberless designers more or less insufficiently armed with the proper experience, knowledge and data for the task, have undertaken to solve the problem with varying results. As long as the principal requirement was to furnish fuel to engines working under a practically constant load and speed and fuel was cheap, the defects of the early carbureters were not such as to interfere seriously with the operation of the engine. Other troubles, such, for example, as ignition, occupied so much of the operator's time, that the carbureter, so long as it worked at all, was neglected.

In the following remarks it is assumed that the engine used has a sufficient number of cylinders to produce a steady flow of mixture and that the carbureter is of the modern float-feed type, with a fuel jet and main and auxiliary air inlets. The fuel is assumed to be gasoline, although in the main alcohol or heavier oils require the same general conditions. The object to be attained is a mixture that will develop a maximum of power from a given size of motor with a minimum of fuel, not an average or "good-enough" result.

With the use of the internal-combustion engine under extreme variations of load and speed, as demanded by the modern automobile, with the perfection of the ignition and other features, and with the rapid rise in price of the lighter oils, the subject of carbureter design becomes one of great interest and importance. Again, in a few years, when the commercial wagon will demand a low fuel cost combined with great certainty and flexibility of engine operation, the carbureter will probably determine the extent of the development of this, the most important branch of the automobile industry.

The function of a carbureter is to supply the proper mixture of air and fuel to the engine, under all conditions of speed and power. The four essential conditions under which carbureters must work are:

First. Wide-open throttle and high engine speed, as when climbing hills or running fast on the level.

Second. Wide-open throttle and slow engine speed, as when traveling slowly on the high gear or picking up from standstill.

Third. Partly closed throttle and high engine speed, as when running fast down grade or on a low gear.

Fourth. Nearly closed throttle and low engine speed, as with engine running idle when car is standing.

For some time it was thought that the best carbureter was one that gave a constant mixture under all conditions. But we now know that a constant mixture is not the best from either the standpoint of best operation or full economy. It was also thought that the best mixture contained just sufficient oxygen to entirely consume the carbon and hydrogen. It was found, however, that a mixture with a slight excess of fuel gave the best results. These facts being demonstrated, it becomes almost obvious that the different engine speeds will demand different mixtures for maximum results. Thus at slow speeds, the mixture should be richer than at high. This is due to the fact that at low speeds more heat is lost to the cylinder walls, more compression pressure is lost by leakage and the combustion can therefore be slower, thus sustaining the pressure. At high speeds the compression is higher, due to less leakage and less loss of heat. Therefore unless the mixture was leaner at high speed there might be danger of pre-ignition. A lean and highly compressed charge also burns faster and hence gives better pressures and fuel economy than a richer one.

The quantity of mixture that an engine will take varies greatly with the speed. At slow speeds the quantity is equal to the

cubic contents of the cylinders multiplied by the number of power strokes. At high speeds of one thousand revolutions and over the quantity may drop to less than one-half the theoretical amount, depending on the design of the valves, inlet piping and carbureter passages. This peculiarity reacts upon the compression and hence on the mixture desired for best results. It will thus be seen that the design of the engine has a great deal to do with the carbureter design, which explains the well-known but seemingly mysterious fact that a carbureter that gives good results on one engine fails to maintain its reputation when applied to one of different design.

The design and class of ignition used have also a marked influence. Poorer mixtures can be used as the spark is hotter, the throttle can be more nearly closed, resulting in increased engine capacity and fuel economy.

To get the maximum power out of a given sized engine the fuel should be introduced into the cylinders as cold as possible consistent with complete evaporation, intimacy of mixture and completeness of combustion. To provide for the heat absorbed by the evaporation of the fuel, hot air is drawn in to form the mixture, the entire apparatus is heated by means of hot water or the general heat of the engine compartment under a closed bonnet is relied upon. The adjustment of this heat is an important matter, but exact knowledge on the subject is apparently nonexistent.

The ever-varying density and compositions of the fuels used and obtainable introduce many and very serious complications into the problem. These differences demand different sizes of jets, different float levels, different amounts of heat to be supplied, and different proportions of air for combustion.

Different densities and temperatures of the fuel affect to a very appreciable extent the flow of the fuel from the jet. Between extremes this has been found to vary as much as 40 per cent. Thus a carbureter exposed to atmospheric temperatures in this latitude would seem to require a wide range of adjustment.

Owing to the absence of a ready means—like the pressure gauge on the water circulation, or the voltmeter on the accumulators—of ascertaining the quality of the mixture being delivered by a carbureter, the majority of the motors in use are operating under more or less disadvantageous conditions, even if carefully and properly regulated at the outset.

The amount of reliable data and facts concerning the action of air and gasoline in a carbureter at the command of designers and students is remarkably small. Of no other part of the automobile is so little known. What is badly needed is a series of carefully planned and exhaustive experiments with data so arranged that it can be analyzed and deductions made.

### STATE OF THE TRADE IN GREAT BRITAIN.

United States Consul Frank W. Mahan, of Nottingham, England, in a report recently submitted to the State Department, says there is a big increase in the automobile industry in Great Britain this year, but that foreign competition is a serious factor. About 16,000 automobiles were made in the United Kingdom in 1905, valued at about \$20,000,000. The imports were less in number, but, average value being higher, the total value was nearly the same as that of the home product. Imports have steadily increased in recent years, and have greatly increased this year so far, in comparison with 1905 and 1904. The exports last year totaled only \$2,500,000, but encouragement is found in the fact that this is an increase of over 50 per cent. in comparison with 1904 and 1903, and also in the fact that the exports in January and February of this year increased nearly 100 per cent. over those of the same months in 1905. The future of the British automobile industry looks very bright.

\*A paper read before the first general meeting of the Society of Automobile Engineers in New York.



## SOME HINTS THAT MAY BE HELPFUL

### Suggestions on Righting the Car After Side Slip.

Now the driving season is on, a few remarks in reference to righting a car that has a tendency to slip in a wet, greasy street may not be inappropriate. Most automobilists of experience know the generally accepted method of pulling a car straight after a side slip, a knack which can readily be acquired with some practice and a little care. The operation is not a difficult one by any means. For instance, assuming a car to be running on a straight road, and for some reason the rear wheels slide toward the gutter on the right, the car will try to run toward the left-hand side of the road, at least it will point in that direction. The uninitiated driver, when he has this experience for the first time, is generally unable to act quickly, and the car may reach the pavement on the opposite side of the street before he can collect his senses. In a case of this kind, the proper method is to turn the steering wheel in the direction that the rear wheels are skidding; that is to say, if the slip is to the left, turn the front wheels to the left, and this will give the car a chance to regain its original tracking as soon as the lateral motion of the side slip is counteracted. If the steering wheel is handled quickly and with judgment, the moment the side slip is felt, its momentum can be reduced considerably. The keeping in mind of the fact that relative motion between the wheels and the road must be prevented, will act as a great deterrent for side slip. By way of illustration, never put on the brakes so hard as to entirely lock the wheels, or accelerate the speed, so as to cause them to spin on slippery streets. While the wheels run freely on the ground, side slip is not to be worried about.

### For Preventing Rust of a Car's Bright Parts.

One petty annoyance to which automobile owners are subjected is the rusting of bright steel parts that are exposed to the weather, and cannot at all times be subject to the beneficial effects of a coating of oil. A few ounces of paraffine wax melted and put into a pint bottle and shaken well until dissolved will make a fine transparent coating over bright parts and will quite effectively prevent moisture from permeating and rust from attacking the parts covered. The mixture can be applied with a brush, and when it is desired to remove the deposit it can be done with a little gasoline applied with a cloth on the part where the preparation is spread.

### A Very Simple Plan for Testing a Magneto.

For those who use magneto ignition and cannot get the motor to work on same when it works all right from the batteries, it is a good plan to test the magneto, as it may need remagnetizing. A simple way to prove this is to press the thumb on the armature spindle and a finger on the magnet and turn the armature. If the machine is in order, a slight electric shock will be felt, not sufficient, however, to cause discomfort. If one hand is placed on the spindle and the other on the magnet while the armature is revolved, a more distinct shock will be felt. By connecting up an alternating current voltmeter with the armature and magnet, it will indicate whether current is generated when the machine is in motion. A supplementary ignition is easily applied to a motor with a low-tension magneto ignition, and make-and-break spark. All that is necessary is a plain spark coil, a four-volt battery and some wire. One battery terminal should be connected to the frame of the motor, and the other to one terminal of the coil. The other coil terminal is connected with the wire which leads to the make-and-break igniters. The motor can then be run independently of the magneto. This plan is sometimes used as an easy starting device, as it can be switched to the magneto when the motor is running satisfactorily.

### Tires Should Be Kept Inflated Hard and Evenly.

Users of non-skidding tires should not be afraid to inflate them very hard—fully 70 pounds' pressure to the square inch, and if the tires are fitted to heavy cars, about 100 pounds' pressure will be nearer the thing desired. It is practically impossible to burst a tire by inflation alone, if the fabric is sound all the way round, and the matter of temperature in summer need not enter in the matter of tire inflation in the least. When a tire is not properly inflated, it will come to grief very quickly, for the reason that the strands in the fabric rub and the friction engendered cuts them in two. When tires burst or explode it is because the strands of the fabric give way, one after the other. Too much attention cannot be paid to this matter of tire inflation, as an even air pressure in all four tubes keeps the diameters of the wheels at a standard and the wearing qualities are enhanced by a large percentage in consequence of this mechanical harmony.



A TYPICAL SCENE IN NEW JERSEY, WHICH COMMONWEALTH HAS INVESTED IN MILES OF GOOD ROADS.

## THE "DOCTORING" OF A PUNCTURE.

By H. W. FIELD.

"Can you doctor up a puncture?" called the man at the steering wheel, as a touring car stopped in front of a garage and supply station in Jackson boulevard, Chicago, the other afternoon.

"Well, I guess yes," returned the keeper of the station, and the car was run into the garage.

Two men occupied the front seat and a woman sat in the tonneau. The automobilist had a spare inner tube, which was tossed out to replace the burst tube, while the two men stepped out of the car to seek refreshment at a neighboring bar, leaving the woman seated in the tonneau.

"You haven't got a jack, have you?" asked the proprietor, as the men alighted.

The reply was in the negative and it seemed to trouble the repairer just a little as they turned away. He sent a boy into the inner office for a jack, which he found after a while. But the lever bolts were loose and the clutch would not take hold to lift.

"Say, chase upstairs and ask Bill to tighten up those nuts," said the "manager" to his small assistant, and the boy got under way again. It was threatening rain outside and the woman passenger was a little uneasy. The "manager" was loosening the ring on the rim for removal of the tire, but it was loosed in all sufficiency long, long before there was a sign of the boy's reappearance. Finally the manager began to lose his temper just a little.

"Holy Moses!" he exclaimed, well under his breath, as he turned from the car in the direction of the stairs up which the boy had gone.

Meanwhile a man in a greasy jumper forty feet away had been looking on. Now he picked up a jack built for lifting a ten-ton truck and came forward with it, only to discover that the jack was at least four inches too high for the axle of the touring car. The two refreshed passengers returned.

"What in blazes! Haven't got that tire off yet?" was the good-natured comment of one.

"They're looking for a jack," explained the man in the jumper.

The "manager" and the boy returned a moment later. Still the clutch would not take hold because the lever was bent until the end struck the floor.

"Get a board," said the "manager" to the boy. The boy got the board—after awhile—and the wheel was at last lifted clear of the floor. The "manager" began to peel the tire off. As he made the first turn of the wheel, grasping a spoke with his fingers, he struck a knuckle against the Columbia's close-in steering knuckle arm, clipping off a bit of skin about as big as a dime. The "manager" swore as audibly as possible with a greasy knuckle jammed into his mouth. But he got the tire off, inserted the new tube, and sent the boy for a pump. It was a hand pump, and it was not new by any means. The man in the jumper pulled the plunger out and discovered that a new washer was needed.

They fixed the plunger upstairs in about five minutes, connected the pump with the tire valve, and at the first stroke the pump hose burst with a hissing sound that might have satisfied a whole gallery at the appearance of the villain in a melodrama.

The "manager" took out his knife, cut off the end of the tube, and replaced it. At the first stroke of the plunger the distended rubber sprung a leak at sixty miles an hour.

"Get a wire!" commanded the "manager" of the small boy, who started again for the foot of the stairs, fifty feet away. The driver of the machine looked in his tool-box and brought out the pliers to bind the tube to the shank of the pump.

"Not too hard," warned the "manager" when the man in the jumper began to pump again at the end of five minutes more. The tire was distending, however, which everyone conceded

was something. Slowly it swelled out. The husband of the woman in the tonneau suggested that she step out and rest a bit, which she did. And the man in the jumper pumped away, while the "manager" closed a thumb and finger around the tube to discourage another leak that was starting.

"Say, I'll show you how to pump!" explained the good-natured driver of the machine, taking the handle of the pump from the wearying hands of the man in the jumper before the "manager" could enter a protest. At the first vigorous plunge of the piston the tube burst wide open in the middle!

"Oh, well, we can get home on that," said the driver, kicking at the tire. "Let her down, and what's the bill?"

"About half a dollar, I guess," said the "manager," sucking at his injured knuckle. "We're going to get a power pump in here as soon as we can get around to it," he added.

The driver's friend cranked the machine, helped the woman into her seat, climbed up himself, and the car backed out of the garage and into the boulevard, only to be halted a moment later by a high falsetto note from the "manager's" small assistant:

"Hi, there! you forgot your pliers!"

And it was raining cats and dogs!



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### SIR CHENTUNG LANG-CHING, IN HIS WINTON.

The Chinese minister to the United States is an ardent automobilist, and the picture shows him at the wheel. In the rear seat are two of his secretaries. The scene is on the banks of the Potomac river near Washington.

## GYMKHANA EVENTS AT LADIES' A. C. G. B. I.

The Ladies' Automobile Club of Great Britain and Ireland has issued its program for the club gymkhana, at Ranelagh, June 30, which last season was honored by the attendance of Queen Alexandra. A number of novel features will be introduced into the program, the leading ones of which are announced and described as follows:

**Bending Race.**—A. For automobiles whose greatest length and width do not exceed over all, without lamps, 9 and 5 feet, respectively; B, for such whose greatest length and width do exceed these measurements. The out-course of 250 yards consists of bending in and out between the posts to the last one, then back in a straight line. The car making the quickest run will be the winner.

**Crawling Race,** 100 yards. Winner to be the car which takes the longest time, on top speed throughout, without throwing out or touching the clutch or using brakes. Stopping the motor or car involves disqualification.

**Ball Race.**—The cars go the full course, dropping balls into tubs on the course without stopping.

**Police Trap Race.**—The competitors make a complete circuit of the course at given speed, the winner to be the car whose speed most closely approaches that arranged for. Watches, clocks or speedometers must be removed from the car or else covered.

**Tilting at Ring.**—Rings about 2 1/2 inches in diameter are hung at intervals of 100 yards round the course; each ring missed adds three seconds to the total time of the car.

**Appearance.**—The competitors will be divided into two categories, for park and touring drives. The full course is about three-quarters of a mile over grass.



## A ROADSTER WITH SURREY SEAT ATTACHMENT

TO provide an automobile mechanically right at a reasonable price has been the aim and object of the makers of the Mora roadster. They have endeavored to keep the weight where it will not make its ownership an extravagance because of tire expense, and yet not so light as to make fast speed impossible or a matter of discomfort. Not so complicated as to require expert knowledge to keep it in order, and not so simple as to lack any essential and vital parts important to steady performance—just a happy medium car with ample power and a little to spare when necessary.

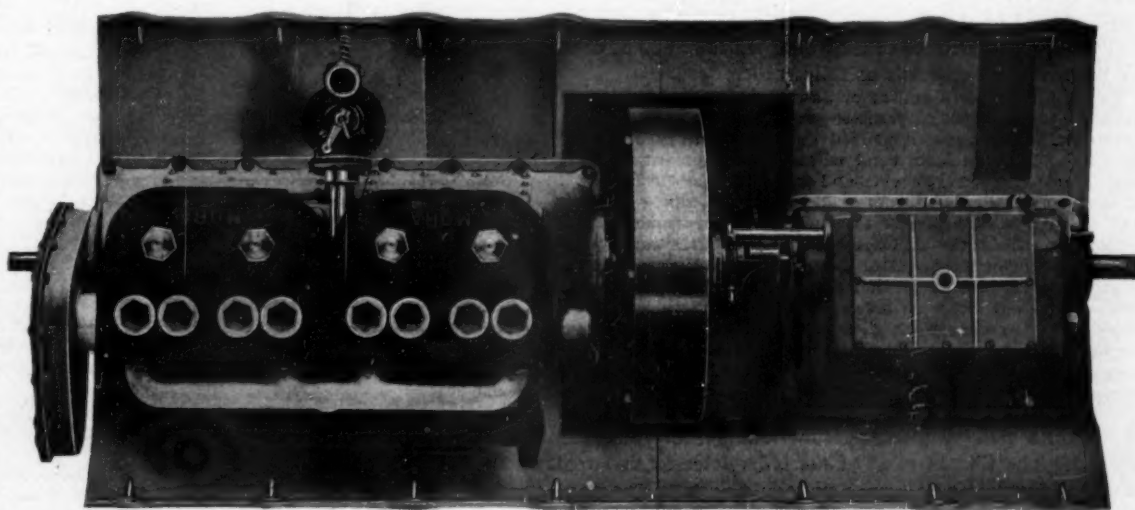
The Mora Roadster, which is the product of the Mora Motor Car Company, of Rochester, with factories at Newark, N. Y., is intended principally for use as a two-passenger car, but, to accommodate those who may occasionally desire to carry more than two people, the body is so designed that the torpedo back shown in the illustration may be removed from the roadster, and a surrey seat substituted. It only takes a matter of ten minutes to make a change of this character, and when it is made the roadster is converted into a comfortable, roomy four-passenger car. The price of the roadster

complete with torpedo back is \$1,650, and the surrey seat is \$125 additional. The approximate weight is 1,700 pounds.

Much mechanical advantage is claimed for the pan construction, which is exemplified in the illustration, as support for the motor and gear set. It is even considered of greater importance than the mud-proof feature, which is original with the Mora Motor Car Company, and patented by it. The ends of the two halves of the lower base are first accurately machined, then the two halves are bolted together, and all the outside edges, inside bolt bosses, surfaces for upper case, and the journal bosses, are all machined at one sitting. This enables the production of a perfect and permanent alignment at three vitally important points—i.e., where bearings are bolted to case; where upper half of engine case, which carries the cylinders, is bolted to case; and where case carrying complete motor and gear is bolted to frame. In assembling, the crankshaft, main, and countershafts are first

aligned on the lower case, then the upper half of the gear box is put in position, and finally the cylinders are attached.

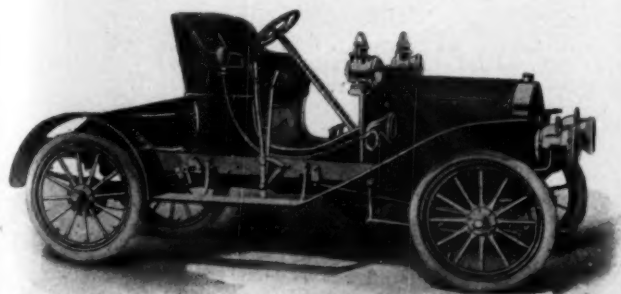
In the construction of the frame, the Mora roadster embodies some characteristics peculiarly its own. The sills are made of best close grain, carefully selected maple, stiffened by armoring through the center with a piece of 30 carbon steel, 3-16 inch thick by 4 inches deep, affording a combined advantage of wood and steel. This original feature of armoring the wood on each side is designed to stiffen the steel from sidewise strain as though it were clamped in a vise, the steel itself affording more than the necessary strength to hold a load many times that which the car will be compelled to carry. The rear axle is of the divided driving type, completely housed, running in tubular axle on ball bear-



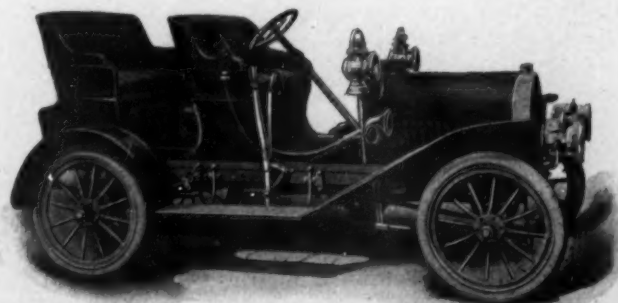
PAN CONSTRUCTION SUPPORT OF MORA MOTOR AND GEAR SET.

ings, and the front axle is tubular with ball bearing front wheels. For the front spring a transverse semi-elliptic is used, and the platform type in the rear. The wheels are artillery type, wood, and 32 inches in size; wheel base, 98 inches; tread, 54 inches.

One point strongly dwelt on by the manufacturers of the Mora is the "mechanically right" features of the motor, and its asserted high efficiency. In the language of its makers, "It is a long-stroke, slow-speed motor which takes hold of and pulls its load steadily and easily, operating as slow as four or five miles an hour and over most hills at high speed, thus necessitating few changes of gear." The motor is water-cooled, four-cylinder, 24 horsepower, 3 15-16x5 1-8, cast in pairs, fitted with special Mora carbureter, jump-spark ignition, fed by single coil and storage battery; throttle and spark control and splash lubrication system. Transmission is sliding gear, three speeds forward and reverse. The car is shaft driven.



MORA FOUR-CYLINDER ROADSTER AS A 2-PASSENGER CAR



MORA ROADSTER WITH SURREY BODY ATTACHED.

## FREE ALCOHOL BILL PASSES.

WASHINGTON, D. C., May 28.—After a protracted debate the Senate, without division, Thursday last, passed the tax-free alcohol bill, and all that remains to make it a law is the President's signature. The bill was reported to the Senate from the Finance Committee on May 23, being reported by Senator Aldrich, who stated that he would call it up in the Senate at the earliest possible moment. The following day he called it up, and in a brief speech explained the various provisions of the bill. As reported to the Senate the bill read that it should become effective from and after January 1, 1907. The original bill as it passed the House was to become effective three months from its passage. Around this change revolved all the debate in the Senate. A number of Senators were unable to see why the date of taking effect should be put off to January 1, and a strong effort was made to hold it down to the period prescribed in the House bill. Senator McCumber said the people were clamoring for the bill. They want it to go into effect immediately so that they can derive some benefit from it before next winter. Senator Aldrich stood out for the date selected by the Finance Committee and he finally won out.

The essential features of the bill as it finally passed are outlined in Section 1, which reads as follows:

Sec. 1.—That from and after January 1, 1907, domestic alcohol of such degree of proof as may be prescribed by the Commissioner of Internal Revenue, and approved by the Secretary of the Treasury, may be withdrawn from bond without the payment of internal-revenue tax, for use in the arts and industries, and for fuel, light and power, provided said alcohol shall have been mixed in the presence and under the direction of an authorized government officer, after withdrawal from the distillery warehouse, with methyl alcohol or other denaturing material or materials, or admixture of the same, suitable to the use for which the alcohol is withdrawn, but which destroys its character as a beverage and renders it unfit for liquid medicinal purposes; such denaturing to be done in a denaturing bonded warehouse specially designated or set aside for denaturing purposes only, and under conditions prescribed by the Commissioner of Internal Revenue with the approval of the Secretary of the Treasury.

Section 2 tells of penalties for violations of the denaturing process. The third section of the bill relates to the employment of an additional force of chemists, etc., deemed proper for the efficient enforcement of the law, while the fourth section provides that the Secretary of the Treasury shall make full report to Congress at its next session of all appointments made under the provisions of the law, and of all regulations prescribed under the provisions thereof, and shall further report what, if any, additional legislation is necessary, in his opinion, to fully safeguard the revenue and to secure a proper enforcement of the act.

## N.Y.M.C. MEMBERS SECURE JERSEY LICENSES.

NEW YORK, May 29.—An innovation has been instituted by the New York Motor Club which will undoubtedly be emulated by other clubs in the vicinity of the metropolitan district. Under the new regulations imposed by the Frelinghuysen law in New Jersey, which goes into effect July 1, every automobile touring in that State must be registered and every person driving a car must be licensed. Registrations may be had (retaining old New Jersey numbers if desired) by filling out blank forms furnished by the Secretary of State, and verifying same before a Commissioner for New Jersey in New York. For the convenience of the members of the club, Vice-President Frank J. Griffin, a member of the law committee, and also a commissioner for the State of New Jersey in New York, volunteered to be in attendance at the clubrooms in the Hotel Cumberland, Monday evening, May 28, where, without charge, he prepared and swore in a large number of applications for registrations of cars, for club members and their friends. All drivers must appear personally before one of the deputies in New Jersey for examination.

Reports from El Paso, Texas, state that the automobile mail line between Torrance and Roswell, New Mexico, has proved so satisfactory that the Government has offered to give contracts for a number of routes in New Mexico and Arizona, which are now served by the "Star" route stages.

## THE AUTOMOBILE CALENDAR.

### AMERICAN.

#### Tours.

- June 5...—Pittsburgh, Pa., Orphans' Day and Floral Parade. Automobile Club of Pittsburgh.
- June 6...—Orphans' Day, Second Annual Celebration by the New York Motor Club.
- June 12...—Chicago, Orphans' Day. Annual Run by the Chicago Automobile Club.
- June 14...—Buffalo, N. Y., Illuminated Parade, Automobile Club of Buffalo.
- June 14...—Baltimore, Md., Orphans' Day, Second Annual Celebration, Automobile Club of Maryland.
- June 16-18—Three-Day Tour, Bay State Automobile Association, Boston to Rye Beach, N. H.
- June 18-23—Second Annual Economy Test, New York Motor Club.
- June 21-26—Second Annual Tour, Albany Automobile Club, Albany to Boston and Return.
- June 23...—Rochester, N. Y., Automobile Floral Parade at Genesee Valley Park, Rochester Automobile Club.
- July 12...—Annual A. A. A. Tour, Chicago to Bretton Woods, N. H., Rules for the Glidden Trophy operative from Buffalo.

#### Race Meets and Hill Climbs.

- June 9...—Hohokus, N. J., Second Annual Race Meet of the North Jersey Automobile Club (Robert Beattie, secretary, Little Falls, N. J.).
- Sept. 3...—100-Mile Road Race, on 25-Mile Circuit in Monroe County, N. Y. Rochester Automobile Club and New York State Automobile Association.
- Sept. 22...—American Elimination Trials for Vanderbilt Cup Race (Long Island Course Probable).
- Oct. 6...—Vanderbilt Cup Race, American Automobile Association.

#### Motorcycle Tours and Contests.

- July 3-7—Annual Endurance Run and Meet, Federation American Motorcyclists, Rochester, N. Y.
- July 4...—Tour to Rochester, N. Y., New York Motorcycle Club.
- July 4...—Race Meet, Milwaukee Motorcycle Club.
- Sept. 3...—Race Meet, Muskegon (Mich.) Motorcycle Club.

#### Motor Boat Races.

- June 16...—Knickerbocker Yacht Club Race, Marblehead, Mass., to College Point, L. I.
- July 9...—Toledo Yacht Club, Open Long Distance Race for Cruising Motor Boats, 119 3-4 miles.
- July 13-21—Annual Cruise American Power Boat Association, Port Washington, L. I., to Shelter Island, Stopping at Norwalk, Thimble Islands, New London, Newport and Block Island.
- Aug. 21-23—Gold Challenge Cup, American Power Boat Association, on St. Lawrence River at Chippewa Bay.

### FOREIGN.

#### Shows.

- Oct. 5-14—Leipzig (Germany) Exhibition, Krystall Palast.
- Nov. 1...—New Zealand International Exhibition opens at Christchurch.
- Nov. 1-16—Berlin (Germany) Automobile Exhibition.
- Nov. 15-24—London, Olympia Motor Show.
- Nov. 23-Dec. 1—London, Stanley Show, Agricultural Hall.

#### Tours.

- June 5-13—Herkomer Cup Touring and Speed Trials, Munich, Bavaria.
- June 11-16—Land's End to John O'Groat's. Auto Cycle Club of Great Britain.
- June 13-16—Scottish Reliability Trials.
- July 26-Aug. 15—Circuit Européen, 3,000 miles, Paris, Milan, Vienna, Berlin, Cologne, Paris.

#### Races, Etc.

- June 26-27—Le Grand Prix, Sarthe Circuit, France.
- July 8...—International Cup Race for Motorcycles, Cesky Club Motorcyclistu of Austria.
- July 15...—Suze-Mont Cenis Hill Climb (Italy). Automobile Club of Turin.
- Aug. 1-15—Circuit des Ardennes (Belgium).
- Aug. 9-12—Malchamps (France) Hill Climb Tests.
- Aug. 15-16—Ventoux (France) Automobile Meeting.
- Aug. 14-19—Ostend (Belgium) Meet.
- Aug. 18...—Liedekerke Cup Race.
- Aug. 23...—Semmering Hill Climb.
- Aug. 27-Sept. 2—Brescia (Italy) Automobile Meeting.
- Sept. 27...—Tourist Trophy Race, Isle of Man, A. C. of Great Britain.
- Oct. 7...—Chateau Thierry (France) Hill Climb.
- Oct. 28...—Gallion (France) Hill Climb.



## HOW ALCOHOL IS DENATURIZED IN GERMANY

Consul General Thackara, of Berlin, writing on the use of denaturized alcohol in Germany for technical purposes, says that the subject was ably and exhaustively treated by his predecessor, Consul-General Mason, in various reports on the subject. He gives the following extract from one of Consul-General Mason's reports regarding the methods in use in Germany for the denaturization of alcohol:

"For most industrial purposes alcohol is used in Germany duty free, after having been 'denaturized' or rendered unfit for drinking purposes by admixture, in presence of a Government official, with a prescribed percentage or proportion of one or more of several different substances prescribed in the very elaborate statute which governs the complicated subject in Germany. There are two general classes or degrees of denaturizing, viz., the 'complete' and the 'incomplete,' according to the purposes for which the alcohol so denaturized is to be ultimately used.

### The Principal Methods of Denaturizing.

"1. Complete denaturization of alcohol by the German system is accomplished by the addition to every 100 liters (26 1-2 gallons) of spirits: (a) Two and one-half liters of the 'standard denaturizer,' made of 4 parts of wood alcohol, 1 part of pyridin (a nitrogenous base obtained by distilling bone oil or coal tar), with the addition of 50 grams to each liter of oil of lavender or rosemary; (b) one and one-fourth liters of the above 'standard' and 2 liters of benzol, with every 100 liters of alcohol.

Of alcohol thus completely denaturized there was used in Germany during the campaign year 1903-4, 931,406 hectoliters denaturized by process (a), as described above, and 52,764 hectoliters which had been denaturized by process (b). This made a total of 26,080,505 gallons of wholly denaturized spirits used during the year for heating, lighting, and various processes of manufacture.

2. Incomplete denaturization—i.e., sufficient to prevent alcohol from being drunk, but not to disqualify it from use for various special purposes, for which the wholly denaturized spirits would be unavailable—is accomplished by several methods, as follows: The quality and nature of each substance given being the prescribed dose for each 100 liters (26.42 gallons) of spirits. (c) Five liters of wood alcohol or one-half liter of pyridin; (d) 20 liters of solution of shellac, containing 1 part gum to 2 parts alco-

hol of 90 per cent. purity (alcohol for the manufacture of celluloid and pegamoid is denaturized); (e) by the addition of 1 kilogram camphor or 2 liters oil of turpentine, or one-half liter benzol to each 100 liters of spirits.

"Alcohol to be used in the manufacture of ethers, aldehyde, agarcin, white lead, brom-silver gelatins, photographic papers and plates, electrode plates, collodion, salicylic acid and salts, aniline chemistry, and a great number of other purposes, is denaturized by the addition of (f) 10 liters sulphuric ether, or 1 liter of benzol, or one-half liter oil of turpentine, or 0.025 liter of animal oil.

"For the manufacture of varnishes and inks alcohol is denaturized by the addition of oil of turpentine or animal oil, and, for the production of soda soaps, by the addition of 1 kilogram of castor oil. Alcohol for the production of lanolin is prepared by adding 5 liters of benzine to each hectoliter of spirits.

"The price of denaturized alcohol varies in the different states and provinces of the Empire in accordance with the yield and consequent market price of potatoes, grain, and other materials. At the present time alcohol of 95 per cent. purity, which is the quality ordinarily used in Germany for burning, sells at wholesale from 28 to 29 pfennigs (6.67 to 6.9 cents) per liter (1.06 quarts), and at retail for 33 pfennigs (7.85 cents) per liter.

### INSTANCE OF AUTO'S ENLARGING SPHERE

NEW LONDON, CONN., May 28.—A traveling man who sells surgeons' supplies made his appearance in a touring car in this city last week. He is one of the first commercial travelers to adopt this method of getting from place to place, and he declared that he saved a great deal of time by it. He calls upon physicians and hospitals, and as the physicians are always scattered over a city, and the hospitals are usually situated outside the city limits, he makes his rounds quicker than he could by any other method.

"So far as I know I am the only labor union agent in the United States owning and operating an automobile in his work," says F. J. McKerness, business agent of the United Carpenters of New Haven. Having duties similar to those of a walking delegate, Mr. McKerness has found the automobile more serviceable than "shanks' mare," and a time saver. With the automobile he is enabled to cover much territory in a day, and keep in constant touch with the union workers whose interests he has in charge.



IN ORDER TO "DISCOURAGE" THE "SCORCHERS" THE TOWN OF CHATHAM, N. J., HAS RAISED MANY CROSSWALKS.

## BOOKS OF THE AUTOMOBILE FIELD.

## "Motor Vehicles and Motors."

In all the great fields of engineering there are certain works that stand out from the mass of technical literature as authorities on the subjects they discuss. In the field of automobile construction probably the really authoritative work—the classic—has yet to appear. Considering those volumes which hitherto have been issued on the subject, however, the foremost place is occupied by "Motor Vehicles and Motors," from the pen of W. Worby Beaumont, the well-known English engineer. The first volume of this work was issued in 1900, and it finds a place in any automobile library that is entitled to the name. Now there has been issued Volume II, so called because it is really intended to supplement or fill out the knowledge of the art embodied in the original work. This new work, however, is really complete in itself, and though it does not include all of the subject matter of the first volume, there is included within its covers such an amount of accurate information as to make it independently of the greatest value to the designer and to the automobilist who has more interest in his machine than as a mere conveyance.

The work treats of modern machines, no space being occupied with descriptions of cars of historic importance only, which were treated in the first volume. The contents are arranged in groups, the distinction being chiefly that of propulsive power. Light gasoline cars are first discussed, with immediate reference to well-known foreign types, and the succeeding chapters contain technical descriptions of the methods of construction employed by leading builders of France, Germany, and England, to the extent of about 200 pages. In two subsequent chapters American gasoline cars are discussed and details of construction given of the Oldsmobile, Cadillac, and lesser references made to the Elmore, Ford, and Rambler cars. Of the larger standard American cars, the Pierce and the Winton alone are included, while the Duryea is given the space of an entire chapter.

Component parts, such as coolers, crankshafts, and axles, and problems for the designer, including power, speed and tractive effort and vibration, and turning effort, are explained and discussed in separate chapters. Steam and internal combustion engine commercial vehicles occupy the next eighty-five pages, English types chiefly being considered. Chapter XXIX commences the section devoted to steam and electric pleasure cars, the White steamer occupying the space of a chapter. The English steamers referred to at length include the Clarkson, Lamp-lough, Albany, and Miesse. The famous French Serpollet is discussed briefly as to certain detail improvements of construction. Chapters on engine dimensions, piston displacement, and mean pressure, overturning and skidding, and carbureters are sandwiched in between the steam and electric car chapters.

English and French vehicles are discussed in the chapter on electrics, but only bare mention is made of American makes. The same omission is noticeable in the chapters on motorcycles which follow, in which the Holden, Humber, and Singer machines, among others of English build, are discussed in detail. Among the foreign machines the Werner is chiefly noticed.

The concluding chapters discuss, among other technical subjects, some special engines, ignition apparatus, and clutches; also special auto steels and spring wheels are described and the cost of passenger transport service is considered.

As will be noticed by a reading of the contents, the subjects are, perhaps, not grouped together in the best way for reference, but this is offset by a well-prepared index. It is far easier to criticise a work of this character than to construct it. When space limitations have to be kept in mind, the task of compilation is an exceedingly difficult one, so great is the mass of data in an industry which has not yet settled down to any condition of systematized design, and in which individual experiment is the guide rather than the collective experience of capable engineers that is available in the older branches of mechanical engineering. And when the material for inclusion is polyglot and representative

of national and widely differing tastes and preferences, the task of the author is yet more difficult. This in part may account for the omission of needed and valuable information about the air-cooled gasoline car, which has reached a very high condition of development in America. There are also similar deficiencies in the brief chapters on components; in the case of carbureters and clutches especially. The faults are those of omission, however, and of course such a work, however exhaustive, can only supplement the careful perusal of the technical periodicals.

There are more than 500 engravings in the work, and therein is one of its most valuable features. They are not merely pictures. Where the reader can be helped to a better understanding of the text by a sectioned or assembly drawing the author has provided it. Many of the drawings are on folded inserts of sufficiently large size so that a scale can be used, and in practically all drawings the relative proportion of parts is immediately apparent. There are 677 pages of text in the work, the type on each measuring 5 by 8 inches and the bound volume 8 by 11 inches. In London it is published by Constable, and in America by the J. B. Lippincott Company, of Philadelphia. The price, bound in cloth, is \$10 net.

## "The Cruise of the Conquerer."

Opportunely for summer reading, L. C. Page & Co., of Boston, have published the sequel to "The Motor Pirate" under the title "Cruise of the Conquerer." The author, G. Sydney Paternoster, rather unexpectedly brings to life the villain, Mannering, after plunging him seemingly to certain death in his marvelous automobile at the close of the first book. In the sequel he appears, after a period of seven years in hiding, as the designer and pilot of the motor boat *Conquerer*, making his first appearance as a competitor and easy winner in the International cup race in the English Channel. His nearest competitors are Sutgrove, the hero, and master of the *Mist*, and Withington, the American millionaire owner of the other leading competitor, the *Challenger*. The narrative marches almost without slackening pace through numerous exciting pursuits of the villain in his *Conquerer*, who quickly develops piratical proclivities of a reckless and almost demoniacal type, in one chapter holding up an English liner off the English coast, and in another kidnapping the Prince of Monaco from his private yacht in the Mediterranean. In the end his pursuers discover the lair of the pirate on the Spanish coast, steal the *Conquerer*, and depart after seeing the place burned by the firing of his store of "petrol" by Mannering and his mechanic. No trace of the men is found after the fire has burned itself out, and though no means of escape can be discovered, it will doubtless be an easy matter to rediscover the villains for a future story.

## "Motor Vehicles for Business Purposes."

Few technical books written on the subject of the pleasure automobile fail to devote a chapter, or at least to give some attention, to the subject of commercial vehicles; but until recently the commercial vehicle industry has not been sufficiently extensive to call for the publication of many books devoted exclusively to it. The commercial vehicle now calls for special attention. An indication of this is found in the fact that A. J. Wallis-Tayler has brought out a book, "Motor Vehicles for Business Purposes," devoted exclusively to commercial vehicles, the subject being treated in a technical manner throughout. Being written by an Englishman, the book is naturally from a British point of view, and one result is that a great deal of attention is given to steam vehicles. The contents include technical data of value to designers and builders of commercial vehicles, descriptions of various types of vehicles, information on practical operation and maintenance, and so on. The book contains 295 pages, including an excellent index, and is profusely illustrated with half-tone and line engravings. The London publishers are Crosby Lockwood & Son, and the New York publishers, D. Van Nostrand & Company.



## THE IGNITION TIMER AND ITS FUNCTIONS

UPON the proper design, construction, and operation of the ignition apparatus of the internal combustion motor depends, to a great extent, the efficiency, the flexibility of control and the satisfactory running of the motor. The various components that go to make up the complete ignition system—the battery or other source of current, the coils, the vibrators, the spark plugs and the timer—must, to give the best results, not only

be properly made, but must be designed with a view to being used together and must work in harmony. The timer is a device that is perhaps as little understood, as easily understood and as often misnamed as almost any other accessory of the motor. Its function of making and breaking the contact is unmistakable, but there are many persons who drive cars who would be puzzled to explain off-hand in what part of the circuit the timer is placed and what happens when the circuit is closed.

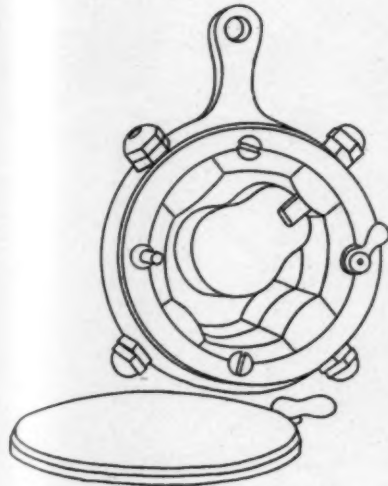


FIG. 1.—PLAIN PLUNGER.

It is worthy of note that the timer is very commonly and altogether erroneously called a "commutator." As a matter of fact, a commutator is a device for reversing the direction of an electric current—which the timer does not do—and the name is, therefore, misapplied when used to designate the timer. The "timer," properly speaking, is the device which opens and closes the low-tension ignition circuits of a gas engine at the proper intervals for producing the igniting sparks; the term "distributor" is more properly applied to the kindred device used to distribute the high-tension current when a single coil is used for the ignition of a plurality of cylinders, and can only be used in connection with a timer in the primary circuit.

The timer is driven at half the speed of the crankshaft of the motor, and so makes one complete revolution while the motor is completing one cycle of operations. The timer must close the circuit once during its revolution for every cylinder of the engine, and there are, therefore, as many contact pieces as there are cylinders.

Essentially the timer consists of a round box of fiber, hard rubber or other suitable insulating material, with a bearing in the middle of the bottom of the box for a shaft, and in the circumference the contact pieces, terminating on the outside in binding-posts. (See Fig. 1.) On the shaft, in the box or case, is an arm which swings round as the shaft rotates, and touches successively each of the contact pieces in the case. One of the most important details of the apparatus, and the detail which differs most in different timers, is the arrangement of the swinging arm and the contact device at the end of it. A

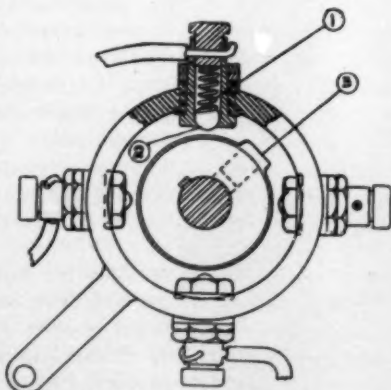


FIG. 2.—BALL CONTACTS.

plain arm of just the right length to touch the circumferential contact pieces would, of course, wear in a very short time so that contact would be made irregularly or not at all; so in all

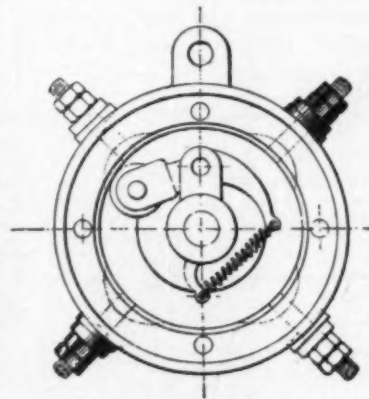


FIG. 3.—ROLLER CONTACT.

timers some spring arrangement is employed to take up wear and at the same time bring the parts into close and firm contact. With regard to the path of the current, it may be well to explain that a good deal of wiring, which is always more or less of a nuisance on a car, is avoided by using the engine, frame and other metal parts to carry as part of the circuit. The primary current commencing at the battery, the current is carried by a wire to the primary winding of the coil, then to the timer, where it passes from the binding posts and contact pieces to the swinging arm and through the shaft and its bearings to the metal of the engine or frame, and thence back to the battery through the second battery wire, which is "grounded" to some convenient part of the chassis. The switch for cutting off the current may be interposed at any convenient point in the wiring. The current is not necessarily carried first to the coil; it may first pass through the timer, the resulting action being the same in either case. The secondary or high-tension is completed in the same way, by grounding. It is interesting to note that though both high-tension and low-tension currents, in distinct circuits, may be grounded through the same engine or frame, they will not get "mixed up," but each will find its own wire and return the right way.

In Fig. 1 is shown an arm terminating in a plunger of hardened steel which is pressed outward by a spring. This gives a plain rubbing contact and the plunger will always move out to take up wear. In Fig. 2 the spring device is located in the circumferential contacts instead of in the arm, the arm being solid and a spring-backed steel ball in each contact piece projecting far enough to touch the end of the arm as it swings around. Each time a ball makes contact it is partly rotated, so that it is kept clean and bright by friction, and is continually changing the contact point.

Spring-backed steel balls are used in other ways in different timers. For instance, the circumferential contacts may be solid and a spring-backed ball carried in the end of the arm; or the solid contacts may be let into the back of the case and a ball in the under side of the arm pressed downward on them; and so on. The timer shown in Fig. 3 originated abroad and has become very popular on both sides of the Atlantic. The circumferential contacts are plain and solid; the swinging arm carries a second arm pivoted as the drawing shows. To one end of the pivoted arm is attached a tension spring tending to bring it toward the timer shaft, and the opposite end carries a large hardened steel roller which is kept in contact with the circumference of the case by the pull of the spring.

The roller idea is, like the ball idea, carried out in a variety of ways. In one timer the roller is placed on the swinging arm

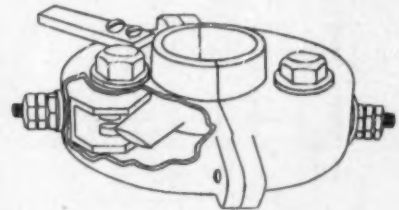


FIG. 4.—DOUBLE PLUNGER CONTACT.

with its axis at right angles to the timer shaft, and bears on the bottom of the case, into which the contacts are set. The roller is of the same diameter from end to end; but the path it travels on is of greater length at its outer circumference than nearer the

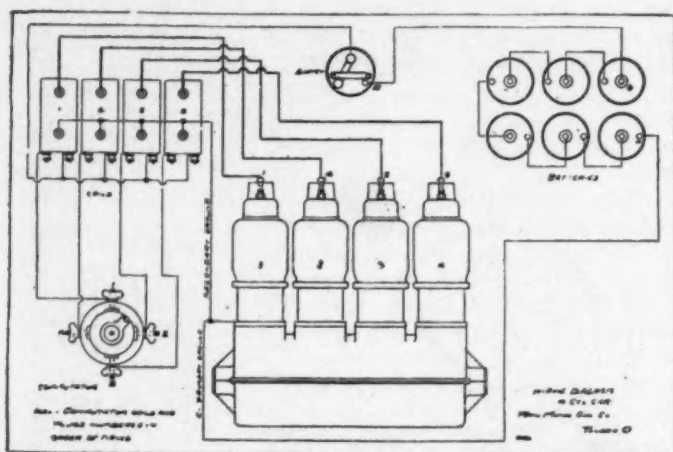


FIG. 5.—TYPICAL 4-CYLINDER WIRE CONNECTIONS.

center. Thus the roller, all parts of the circumference of which must be moving at the same velocity, must slip over some part of its path, and the slight friction thus set up keeps its surface and the surfaces of the contacts clean and bright.

A plain flattened blade of steel forms the arm of the timer shown in Fig. 4. The end of the arm passes between two little vertical plungers, normally pressed toward each other by springs and forced apart by the blade as it swings around. This timer is peculiar in having a bronze case with the contacts set into insulating bushings. In Fig. 5 is shown a typical ignition system diagram, with four coils and timer for the ignition of a four-cylinder engine.

So far all the timers referred to are designed to handle the primary or low-tension current only, the secondary circuit being a closed circuit at all times, and with this arrangement a separate induction coil is used for each cylinder. In

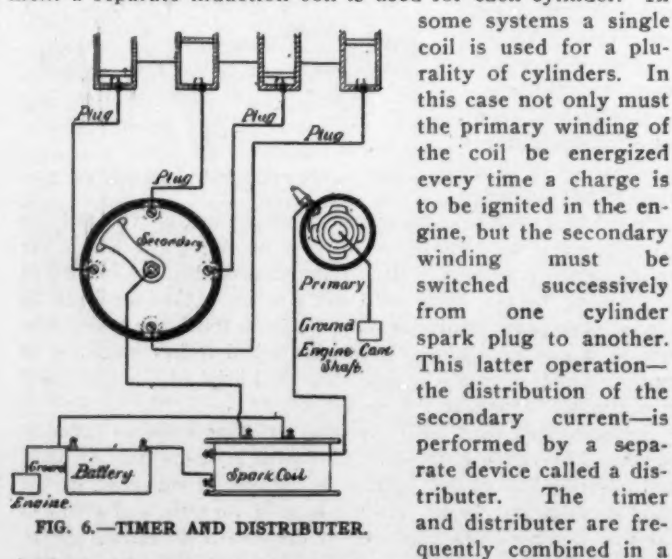


FIG. 6.—TIMER AND DISTRIBUTER.

some systems a single coil is used for a plurality of cylinders. In this case not only must the primary winding of the coil be energized every time a charge is to be ignited in the engine, but the secondary winding must be switched successively from one cylinder spark plug to another. This latter operation—the distribution of the secondary current—is performed by a separate device called a distributor. The timer and distributor are frequently combined in a

single instrument, an example of which is shown in Fig. 7. Both are mounted on the same shaft, insulated from each other, and inclosed in the same casing. In the engraving the primary timer may be seen at the back of the case. As there is but one coil, the timer is not required to distribute the current, and there are four solid arms making successive contacts with a single contact in the case. The distributor contacts, however, are connected by wires with the spark plugs. The secondary current is carried in through a binding-post and spring-pressed ball in the case which makes contact all the

time with the secondary arm at the center. In some distributors there is no actual contact between the swinging arm and the contact points. The space between the arm and the contact, when the arm is in position for the passage of current, is so small that the high-tension current readily jumps the gap. In this way wear of the parts is avoided. Fig. 6 is a diagram of the wiring and arrangement of parts when a single coil and combined timer and distributor are used with a four-cylinder engine. The timer and distributor are shown separately to avoid confusion.

In all these timers the shaft rotates while the case containing the contacts remains stationary. In order to cause the ignition to occur earlier or later in the stroke of the motor, the case is arranged to be rotated through part of a revolution, thus causing the contacts to be made earlier or later in the revolution of the shaft. This makes it necessary for the wires leading from the timer to be left slack enough to allow for the necessary movement. To avoid these loose wires, which sometimes break from the constant vibration and movement, and are usually more or less unsightly, timers have been made in which the wires are stationary, being connected to brushes which bear on brass strips which, in turn, are in electrical connection with the contacts of the timer.

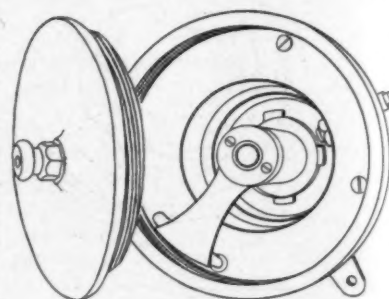


FIG. 7.—DISTRIBUTER

## WISCONSIN'S GOOD LAW MAY BE REPEALED.

MILWAUKEE, Wis., May 28.—The Wisconsin automobile law, which is state-wide in its operation and which provides for a maximum speed limit of twelve miles an hour in the city and twenty miles an hour in the country, is in peril. That is, if Mayor S. M. Becker, president of the Milwaukee Automobile Club, does not change his views before the next meeting of the Legislature. Mr. Becker in an interview said that he intends to make an effort to grant all cities in the State the right to provide their own automobile regulations, in order that reckless driving may be stopped. His statement was undoubtedly prompted by a recent accident, in which a young woman was run down and killed on one of the principal downtown streets. The unfortunate mishap has aroused considerable feeling, and several editorials have appeared in local papers, demanding more stringent automobile legislation.

Previous to the past week the law governing the use of automobiles in this State has been considered very fair both to owners of cars and pedestrians. It will be remembered that through the efforts of the Milwaukee Automobile Club, and particularly its secretary, James T. Drought, a law providing for liberal speed regulations, state-wide in operation, and for the licensing and numbering of machines, was enacted, the latter provision being accepted by the autoists in exchange for the two former.

"As a matter of fact," said James T. Drought, "the law has proved successful. The automobilists have enjoyed fair speed limitations, and that pedestrians and other users of the highways have been protected is evident from the manner in which the law has operated."



## THE RACING CAR OF THIS AND NEXT YEAR

By GEORGES DUPUY

Those makers who are going to participate in the international competitions this year and the next, if they hope for success, must have cars that will perform best over exceedingly fast circuits, level and smooth, with few turns and few hills. The two important courses of 1906 are those for the Automobile Club of France Grand Prix race, to be run on the famous La Sarthe Circuit, June 26 and 27, and the great American event, the Vander-

ing allowed for the magneto). We are aware that there is no incentive whatever to go under this limit. In fact, the power utilized at the rim is limited by the adherence of the driving wheels to the road, and this adherence is the "function of the weight." If the motive power exceeds the traction of the tires the wheels do not bite but slip excessively—that is, when they run faster the speed of the car does not increase and the excess of power is transformed into heat, which is prejudicial in every respect, especially to the tires. Then, to obtain more utilizable power there must be more adherence, consequently more weight, particularly on the driving wheels.

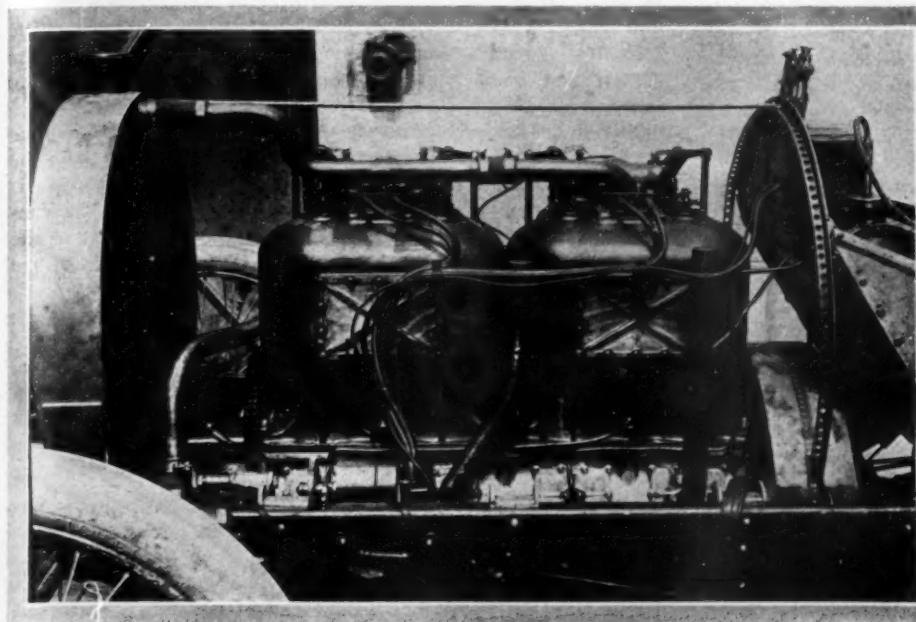
### Modify Lines of the 1907 Car.

This leads us to somewhat modify the lines of the 1907 racing car. Its weight—empty—is 2,240 pounds; for the complete starting weight we must add that of two men, tools, fittings, tires, gasoline, oil, etc., which is about 600 pounds more. Total, 2,800 pounds, gross weight.

On the 2,240 pounds "empty weight of the car" one generally admits 1,300 pounds for the front axle and 900 for the rear axle. It is of advantage to put the supplementary 600 on the rear; that result is obtained by placing the two men right over the rear axle and by disposing the tank and all fittings behind them. We might approximately suppose, in all that follows, that the rear load is 1,500 pounds. Under such conditions, if we admit 0.66 as the proper value of the coefficient friction on a nice smooth road, the adherence of the vehicle will have an average value of

$$1,500 \times 0.66 = 998 \text{ pounds.}$$

Suppose now that the builder wishes to establish a vehicle capable of racing on a straight line at an average gait of 160 kilometers (100 miles) an hour, that is to say about 41 meters a sec-



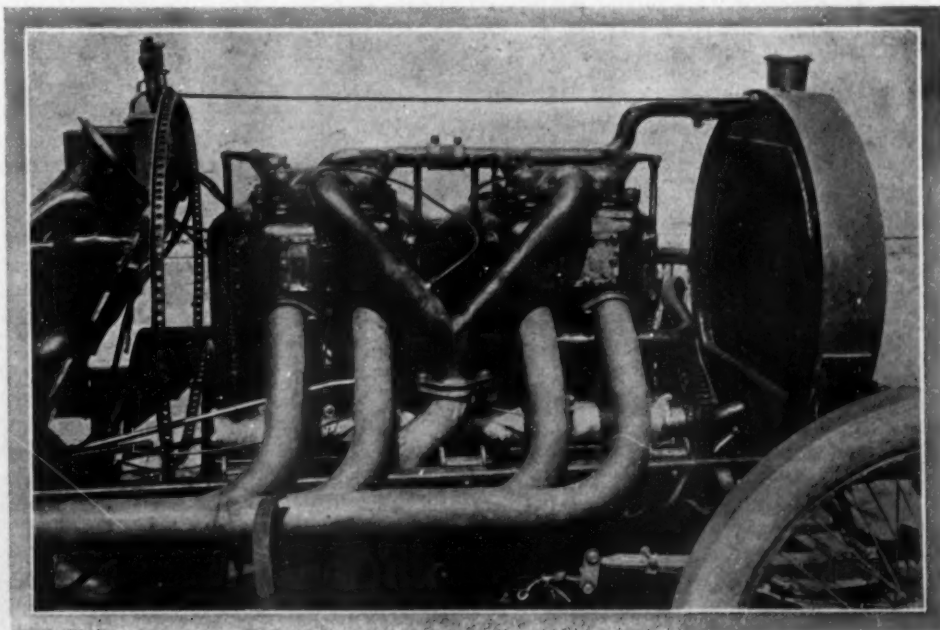
130-HORSEPOWER MOTOR OF NEW HOTCHKISS RACER.

bilt Cup race, October 6. Undoubtedly the efforts of the European builder, in constructing his fast racing monsters for 1906, were dictated chiefly by the configuration of these two racing grounds.

Very different were the conditions of last year from those now prevailing. Compelled to build a vehicle susceptible of facing the Circuit d'Auvergne, with its terrific up and down quarters of miles, its dangerous double turns bordered with precipices, the constructor sent to the starting line a much shorter and lower type, with medium wheel base, reliable clutch, powerful gear box, very carefully fitted brakes, and a motor of a non-exaggerated power. At the same time the vehicle was relatively light.

If we take into account the fact that this year the Automobile Market of the world is mainly interested in two racing events—and both are to be contested over comparatively smooth courses—we come to the conclusion that early this season the European builder formulated a theory as to what particular type of car he was going to establish. And what shall be, we next ask, the car of 1907? Will the actual engine improve every year, or is it likely to stand with its acquired stage of perfection for a certain period?

First of all, we know that all the vehicles qualified in the international events must not exceed the weight of 2,240 pounds (15 pounds in excess be-



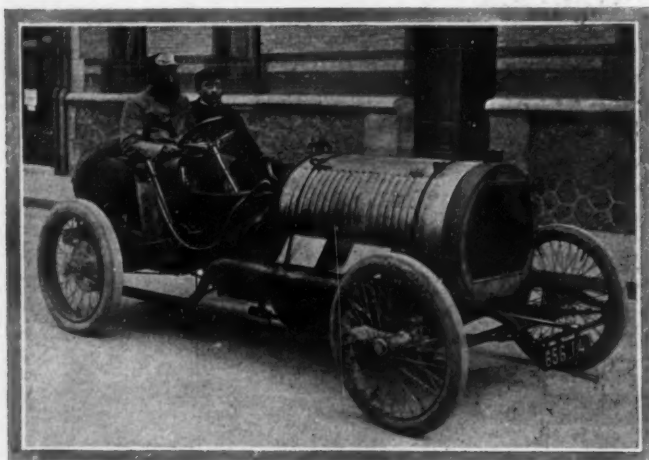
EXHAUST SIDE VIEW OF 130-HORSEPOWER HOTCHKISS RACER.

ond, we must look out for the resistances the car will have to overcome. In the first place there is the friction resistance which can be assumed to be equal to 25 pounds per ton, and which is sensibly independent of the speed. On the other hand there is the air resistance which, as we know, increases as the square of the speed, so that if "R" is the total resistance to be overcome, and "S" the speed in meters by second, we can write the following equation:

$$R = (12 \times 1.3) + KS_2 = 15.6 + KS_2.$$

The proportional coefficient "K" varies according to the forms of the car. It is of the greatest importance to diminish this and consequently to give to the vehicle appropriate lines.

An important provision would be to place underneath the car a large sheath, assuming the form of a boat hull, in order to avoid the retarding air eddies; also the builder should suppress as much as possible projections of the body, and reduce the whole rear portion of the machine as much as he can. We are justified in assuming under these conditions that the builder will get for



LE BLON IN HIS NEW HOTCHKISS RACER.

"K" a value of 0.06, so that there would be as a total value of the resistance (at the needed speed of 41 meters—50 yards—a second)

$$R = 15.6 + 0.06 \times 41 \times 31 = 116 \text{ about}$$

value notably inferior to that of the adherence and our wheels will not slip excessively.

#### What Shall Be Power of Motor?

Now, what shall be the power of the motor? The power to be transmitted to the rims is, as we know, the product of the resistance by the speed of the displacement—that is to say:

$$116 \times 41 = 4,756 \text{ kilogrammeters-second (by the metric system)}$$

$$\text{or } \frac{4,756}{75} = 63 \text{ horsepower about.}$$

In admitting an efficiency of 60 per cent. for the ensemble of the transmission the motor should develop a power of

$$\frac{63}{.60} = 105 \text{ M. P.}$$

These figures are somewhat less than those we are accustomed to. The great difference comes solely from the quantity adopted for "K," which demonstrates the value of taking into account that important factor—the air resistance.

With a view to meeting the unforeseen, it would be prudent to take a motive power slightly superior. It goes without saying that if we would attain a speed higher than 160 kilometers (100 miles) an hour, we should have to increase the motive power. Thus, we would see, by working a similar calculation, that for

A speed of	94 miles (150 km.)	an hour we need an engine of	105 M. P.
"	100 "	"	120 M. P.
"	106 "	"	145 M. P.
"	112 "	"	220 M. P.
"	125 "	"	280 M. P.

But when the power increases the weight of the motor and that of the different organs of transmission increases also, and we are

aware that the constructor must not go beyond the allowed weight limit. We have, however, a certain margin in the matter of weight, of which we are going to recognize the utility. We know that Darracq has been able to place a 200 M. P. engine on a 2,200-pound car. However, I don't think there is any use in going over 120 horsepower as a maximum, strictly on account of the necessary weight margin referred to above. One may as well note, before going any further, that a constant speed of 150 kilometers an hour will, save in case of accident, permit the driver to realize on a course like the Circuit de la Sarthe—which has only three "slowing points" each lap—an average of 75 to 78 miles.

From the fact that the motor will work at full admission, so to speak, from start to finish, it must be exceptionally robust. Our builder will be compelled, perhaps, to increase the value of the coefficients of safety usually employed; particularly as far as the compression chambers and the connecting rods are concerned. He will also perfect his cooling system and his exhaust valves.

The clutch has become an element sufficiently perfected and we shall not lose time in a dissertation upon it. But what about the gear box? I think that in 1907 we should have but three speeds with high direct. As far as the Circuit de la Sarthe and the Vanderbilt Cup are concerned, two perhaps might be sufficient, as the shifting can be operated rather fast. (The new Darracq 140 M. P. has only two and the reverse.)

#### Concerning the Form of Transmission.

Now what shall be the transmission? I am personally an apostle of the cardan shaft. I believe that it gives better results than the chain. One may perhaps object that the non-suspended weight is more considerable and thus the wear upon the tires may be larger. I will some day try to explain my reasons for preferring the cardan shaft on the racing machine.

#### What Is Needed in Tires.

Now let us face the tire question, which is of so much interest, since in the A. C. F. Grand Prix race the repairs to and changing of the shoes have to be made from the supplies and with the tools carried on board the cars. My opinion is that both in la Sarthe and the Vanderbilt race there will be very few punctures, as both courses will be in the most perfect state. The chances of bursting tires, on the contrary, are numerous, for the envelopes are going to be subjected to an enormous peripheric speed and will be exposed to tearing away because of their being heavy. I believe, however, that the manufacturers of standard tires are capable of making shoes light and strong, if they only put in them enough canvas and also a sufficient number of safety bolts on the rims. I also would lean toward wheels of large diameter—910 x 90 mm. in front and 920 x 120 mm. at the rear.

As a conclusion, I think that this season and the next, in France and in America, the winning car, equipped with a motor of 110 to 125 M. P., will have averaged a speed of 75 miles; 78 to 80 miles may be realized on certain laps.

#### CHAUFFEURS TO HAVE NOVEL COMPETITION.

PARIS, May 21.—A great novelty in automobile competition is that which the League des Chauffeurs intends to organize this season. Notwithstanding improved springs and shock absorbers, many automobiles, when traveling at high speed, are unpleasant to ride in, giving to the passenger in the rear seats a sensation somewhat akin to seasickness. The League by its competition hopes to arrive at a better state of affairs.

Competitors must come to the starting point at the Porte Maillot, in the western suburbs of Paris, provided with sixteen milk bottles and two wire cage carriers to hold the bottles upright. The bottle carriers are attached to the floor of the car, in the one of the side entrances, the bottles filled with water and left uncorked. A waterproof cover is placed over the bottles, leaving a good space between the two, and sealed down. The car which covers the distance between the Porte Maillot and Bougival, and back to Paris at a given speed with the larger amount of water in the bottles will be the winner.



## WHAT THE AUTOMOBILE CLUBS ARE DOING

### Syracusans Putting Up the New Road Signs.

SYRACUSE, N. Y., May 28.—The Automobile Club of Syracuse will, if possible, have all the new signal posts put in place before the Glidden tourists reach this neighborhood. W. H. Smith went over the ground as far as Cortland last week and F. H. Elliott went to Auburn in the interest of the signs. Last week Messrs. Brown, West and Elliott took in Canastota, to which place the placing of the posts from here is in the hands of the Syracuse club.

The Utica club has charge of placing the signs beyond Canastota to Utica and activity is reported. Between Syracuse and Binghamton the respective clubs are to divide the expense and labor. The route of the Glidden tourists hereabouts has been laid out and an outline forwarded to Mr. Hower. The route is through Geneva and Auburn. Officers of the Automobile Club of Syracuse say the signs of the Syracuse district will all be in place ere the tour begins.

### Washington's New Club House Nearing Completion.

WASHINGTON, D. C., May 28.—Good progress is being made in the work of erecting the new country club house of the Automobile Club of Washington. The building permit, which was issued some weeks ago, calls for an expenditure of \$4,500, and it is believed a very spacious clubhouse can be erected for this sum. When the new quarters are ready for occupancy the club will have a grand housewarming, and the occasion promises to be the greatest event of the kind in local automobile history.

At a recent meeting of the club a committee of five was appointed to investigate the feasibility of holding a hill-climbing contest under the auspices of the club. This committee is working hard on the project and there seems to be a good deal of interest manifested in the event. A club run of two days' duration is also being talked about.

### Shake-up of Dry Bones Due at Ohio's Capital.

COLUMBUS, O., May 28.—There are signs that the Columbus Automobile Club will awaken from its state of coma and demonstrate to outside clubs it is still on the map. Last winter it was partly decided to hold a big meet here around the Fourth of July, but nothing has been done and in all probability the proposition will be declared off. There have been murmurings of discontent on the part of some of the officers and leading members over the inactivity of the club, and as a result a general shaking up may take place. It is understood that some of the most influential members have declared that if there is not soon a greater manifestation of zeal and progress on the part of the organization as a whole, that they will withdraw from it. This prodding, it is thought, will result in an early meeting in the club's handsome quarters which will revive old time interest in the organization and its work.

### Will Bring Law Violators to Bar of Justice.

WILMINGTON, DEL., May 28.—As a result of a recent automobile accident near Middletown residents of that town are up in arms against drivers of machines who travel at excessive speed, and at a meeting of the Delaware Automobile Association held in Wilmington it was decided to assist the authorities in an effort to fix responsibility for the accident. Ever since the accident the authorities have been making an effort to obtain information as to who was in the automobile and who was responsible for the collision, and the local association, at its meeting, decided that unless the driver or owner of the machine comes forward and accepts responsibility it will offer a reward for this information.

### Marylanders Will Have Orphans' Day, June 14.

BALTIMORE, May 28.—The second annual Orphans' Day outing and parade, under the auspices of the Automobile Club of Maryland, will occur on Thursday, June 14. A committee, composed of Frank W. Darling, George S. Dickey, secretary of the club, and Louis S. Greensfelder, has been appointed to attend to the arrangements and most of the charitable organizations of the city have already expressed their intention to co-operate in the effort to give the youngsters a pleasant outing. It is expected that 500 or 600 children will be in the ride. The plans include a parade in the city, a trip through Druid Hill Park, and a run out Park Heights avenue to Electric Park, where light refreshments will be served. Invitations have been extended to all automobile owners of Baltimore and the adjoining suburban towns to contribute their cars.

### Bison City Automobilists Plan Illuminated Parade.

BUFFALO, May 28.—F. B. Hower, vice-president of the Automobile Club of Buffalo, and a member of the touring committee of the A. A. A. will lay out the route of the Glidden tour between this city and Saratoga. He has practically mapped out the course, but will go over it in his car to examine the route personally.

The club is making active preparations for its illuminated and decorated parade on the evening of June 4. Last year the parade of this character was a most successful affair, and this year's affair promises to eclipse its predecessor.

### CLUB DOINGS IN GENERAL.

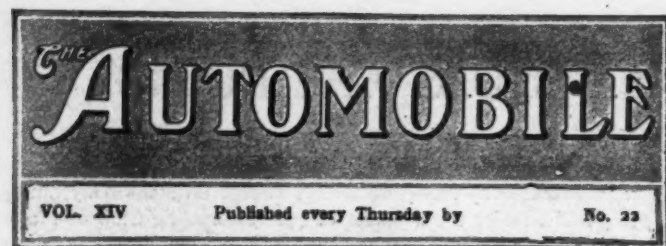
MILWAUKEE, WIS.—The Milwaukee Automobile Club has secured club quarters. A meeting of directors was recently held and it was decided to engage rooms at the St. Charles Hotel. The club is taking an active interest in automobile legislation and is anxious to assist in protecting the rights of all users of the public roads.

MONTREAL, QUE.—With a view to the improvement of roads in the vicinity of Montreal, the Automobile Club of Canada has offered two prizes of \$100 each for the best-kept sections of road between Bout de l'île and Senneville, and Beaconsfield and St. Anne's. The club is in a flourishing condition; twenty-one new members were recently added to the roll.

DALLAS, TEX.—After a considerable period of quiet, the Dallas Automobile Club recently held a meeting at which the members discussed the scheme of leasing the local trotting track for automobile races on Wednesday and Saturday afternoons. A number of club runs for the summer are being arranged for. The number of automobiles in use in Dallas is increasing, the tendency being toward large types of cars.

ASHTABULA, O.—The first automobile parade in the vicinity of Ashtabula was held on Tuesday, May 22, and twenty-two members of the Ashtabula Automobile Club lined up for the run to Conneaut. As is usually the case in automobile parades, there was more or less speeding between the larger machines. The club has forty members, and it is anticipated that within a few weeks the number will be doubled.

ST. JOSEPH, MO.—The St. Joseph Automobile Club has been permanently organized, with Huston Wyeth as president; Louis T. Golding, vice-president; R. E. Culver, secretary, and Henry Krug, Jr., treasurer. A committee was appointed to draft a constitution and by-laws. The St. Joseph automobilists plan to co-operate with automobilists in Atchison, Leavenworth, and Kansas City, with a view to securing good macadamized roads between the four cities. Active work in the good-roads field is to be carried on.



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### Driving on the High Gear.

For many automobilists there seems to be a fascination about the use of the high gear in a car equipped with the usual range of change-speed gears. That a car is capable of ascending certain familiar grades on high gear is sufficient to give it a high place in the estimation of this class of persons. Just why this feat, as it may be called, should give the car preeminence, they might not be able to tell in a convincing way; perhaps it is that because the performance is of the nature of a feat that it appeals to the desire for proprietorship of a machine capable of something "out of the ordinary." It is probably the same spirit that causes a buyer to pay a phenomenal price for a car that has won some famous race.

There are advantages in high gear capacity, such as noiselessness when the drive is direct, with no change-speed gears in mesh, and, invariably, in the comparative infrequency of exhaust discharges, and for the man who finds no delight in car manipulation there is a pleasant freedom from bothersome gear changing. There is another side to be considered that does not come under the term "advantages." Were weight and cost negligible quantities in automobile construction every car could have an engine big enough to dispense with gears altogether. Commercially they have to be considered, and the use of the gear box permits of the necessary economies in these directions; and if the gear box is a good thing to carry, it certainly should be a good thing to use. The only other alternative would be to fix the drive ratio so that the car could go anywhere on the direct drive; in which case it would be altogether too slow on the level, even with the motor racing.

When a hill is to be climbed that cannot be rushed, failure to change back means a slowing down of the motor. This causes a reduction in piston speed and an extension of the time interval of

the functions of the cycle—with, of course, a long admission period. Heavy charges and heavy initial pressures are the result, with increase of stresses which, though they may not cause bending or fracture, certainly do not prolong the life of the mechanism. It should be remembered, too, that the same results will follow an injudicious use of the high gear on the level, in street traffic for instance. Acceleration after a stop for a street crossing will produce the same conditions. Throttling will not prevent this, for the throttling effect is closely related to the speed of the motor. A partially closed throttle at low motor speeds may give as high initial pressures as a wide-open throttle with the engine running at high speed when the car is going fast. It should not be forgotten that the atmospheric pressure upon which the charging of the cylinder with explosive mixture is dependent is the same, at any given elevation, whether the motor is running fast or slow.

An intelligent use of the change-speed gears is necessary for efficient operation; a lesson in this direction might be learned from observing the methods of the great drivers in a race, such as for the Vanderbilt Cup.



### The Automobilists and the Orphans.

The automobilist who once a year loans his car for "Orphans' Day" can hardly fail to feel a sense of satisfaction when he reads of the pleasure that has come to the homeless ones as the result of the day in the fresh air, and treated to sights unfamiliar and seemingly wonderful. Recollect yourself the first ride that you took in an automobile and recall the exhilaration of it, the joy of traveling over the smooth highway, the refreshment that it brought to your overworked nerves, and then you will appreciate what a treat it is to these poor orphans, a comparatively small number of whom have this once-a-year opportunity of enjoying the delights of automobiling.

This decent act of automobilists has done much to dispel prejudice and diminish antagonism from those less fortunately situated, and the selfishness and disregard of the rights of others mistakenly accredited to all automobilists when such a feeling belongs only to the few is convincingly shown to be an erroneous impression.

Clubs in many cities throughout the country have followed the example of the New York Motor Club, which a year ago set the ball a-rolling at the suggestion of W. J. Morgan, who can rightly claim the original idea as emanating from his energetic brain. Again this year the club is repeating its kindly act, and though many cars have been offered it can find use for an unlimited supply, for the reason that New York City probably contains more orphans than any other city in the country. Therefore, you of a generous disposition, notify Mr. Morgan at the New York Motor Club, Fifty-fourth street and Broadway, that your cars are at the club's disposal.



### The Fascination of Record Speeding.

That the general public still thrills at the spectacle of record speeding was shown conclusively at the Empire City track last Saturday when Walter Christie sent his "Blue Streak" whirling around the dusty track in 52 seconds, a performance that equaled Barney Oldfield's world record made at Los Angeles and unbroken for over two years. Unquestionably of more practical value were the less exciting events that preceded the Christie mile, but the apathetic public gave comparatively slight attention to that which should have interested them in greatest degree. These tamer contests were absorbing to the participants in the same manner that golf is of great moment to the player, but of lesser interest to the casual onlooker. In automobiling the matter of speed is still highly important from a publicity standpoint, for the Christie mile will be remembered by those who saw it for a longer period than all the rest of the program. Of course, this shouldn't be so, but the fact remains that the average man or woman these days seems to prefer the "thriller" to the more commonplace though useful happenings.



### NO HUNDRED YARDS TRAPS IN BAY STATE.

Boston, May 26.—Governor Guild of Massachusetts has signed a bill increasing the automobile speed limit to twenty miles an hour. The Governor put his signature to the measure last Thursday, and it will go into effect in thirty days from that date. The twenty-mile limit applies to the country roads, where before only fifteen miles was permitted, but the limit in the thickly-settled districts has also been increased from ten to twelve miles, the limit at corners, crossings, etc., remaining at eight miles, the same as before. The new law also carries with it another very important concession to automobilists, a concession which is regarded by many as of equal importance to the raising of the speed limit. This is the fixing of the length of so-called "automobile traps." Hereafter the 100-yard traps that have been used with much profit on country roads will not be legal. In the districts where the limit is twenty miles, the trap must be at least a quarter of a mile long, and in the districts where the limit is twelve miles the trap must be at least one-eighth of a mile long. Violation of these limits, however, constitutes a prima facie case against the offender, so that the arresting officers will have to show only that the speed limit was exceeded in order to bring the automobilist into court. The increased speed limit and statutory definition of the length of a trap were not secured, however, without some concessions, and these are to be found in the new punishment section.

### CHAIRMAN THOMPSON TO ATTEND GRAND PRIX.

The Racing Board of the American Automobile Association, serving in its capacity as the Vanderbilt Cup Commission, held a session Monday afternoon at the rooms of the Automobile Club of America, New York City. The principal subject under discussion was the French entries for the Vanderbilt race. The situation was referred with power to Chairman J. D. Thompson, who will sail for Europe, June 6, on the Baltic. It is understood that the finish of the Grand Prix, which Chairman Thompson will attend, will serve as a basis for the selection of the French cars for the Vanderbilt race, if officially a report is received verifying the printed statements that the Automobile Club of France has declined to attend to the duty as it did last year. Chairman Thompson will appoint a French representative to receive the entries of the French makers, several of whom have signified their desire to participate in the American race. The French makers realize the importance of the Vanderbilt from a publicity standpoint.

### EUROPEAN CIRCUIT MAY BE POSTPONED.

Paris, May 18.—Three more entries have been made for the European Circuit touring contest, bringing the total up to fifty-two. The late arrivals are La Métallurgique (Belgium), Minerva Motor Co. (Belgium), and Aleyon (France). Entries, which, it will be remembered, were postponed from April 20 to May 20, close in two days, and there is thus no possibility of the 140 cars which were at one time looked upon as possible starters being entered for the contest. From Germany a request has come that the tour be postponed until next spring, and many a French constructor hard pushed to regain the time lost by the strike would not be adverse to such a change. The committee will meet at a very early date to decide if any change has to be made.

### AUTOS SOLD BEFORE THE HORSE BLOCK.

Boston, May 26.—The automobile made its first appearance before the block in a horse auction room in Boston this week, at a sale of second-hand cars conducted by a firm which has hitherto been identified exclusively with horse and carriage auctions. Some fifteen cars were offered, and they brought very good prices, an average of about 50 per cent. of the first cost being obtained. The cars were from one to three years old, and the visitors bought on outside appearances, after seeing the cars run up and down the street outside the stable.



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SENATOR TILLMAN TAKES A WINTON RIDE.

### INCREASED AUTOMOBILE EXPORTS.

The American *Exporter* calls attention to the increased exportation of automobiles as a promising indication of a growing foreign trade in that line.

The exports of American automobiles during the year 1905 were the greatest in the history of this industry, the grand total being \$2,695,655, as compared with \$1,897,510 in 1904, and \$1,643,029 in 1903. During the year our best customer was the United Kingdom, to which we exported \$707,045 worth of automobiles. Canada bought automobiles to the value of \$537,588; France, \$269,703; Italy, \$163,978; Germany, \$105,457, and the rest of Europe, \$239,379. To Mexico our automobile shipments represented a value of \$192,452; the West Indies, \$151,859. Considerable quantities were also shipped to British India, Australasia, South Africa, South America, and Oceania. That the present year will be a record breaker in the matter of automobile exports is indicated by the figures shown in the statistical returns for the first two months of 1906, during which the shipments abroad amounted in value to \$630,407, as compared with \$456,281 during the first two months of 1905. In the line of American motor boats the exports are also steadily and extensively increasing.

### AERO GORDON BENNETT, SEPTEMBER 6.

The Automobile Club de France has at last secured permission from the French Government to use the Tuileries for the forthcoming Aero Gordon Bennett, and the event will take place on September 30. The balloons will ascend in alphabetical order, according to nationality, America leading off. The profit, if any, from the small admission fee will be donated to charity.



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WASHINGTON RUBBERNECKS FRONT LONGWORTH HOUSE.

## WHY ONE MAKER QUIT SIXES.

E. R. Thomas, on being asked why he discontinued the construction of six-cylinder cars, made the following reply:

"It is true that the E. R. Thomas Motor Company has had a great deal of experience with six-cylinder cars, and at the start was quite enthusiastic over their fine running qualities. But after a long series of the most exhaustive and thorough tests, both by its own and outside experts, it abandoned the construction of six-cylinder touring cars and is confining its efforts to four-cylinder touring cars, because of the belief that they are far better suited to the requirements of the general public. We admit that six cylinders are flexible. The torque is more constant, and vibration less. The slight advantage, however, is not perceptible, in a car of adequate power, when on the road.

"The disadvantages of six cylinders are not only numerous, but to our way of thinking, very serious, and very far outweigh the slight advantage claimed. It is obvious that six-cylinders weigh more than four, and hence the weight is greater on the front axle. The four-cylinder car is easier to steer, is easier on front tires and is more comfortable, as the car being lighter in front will surmount obstacles with less jar and strain.

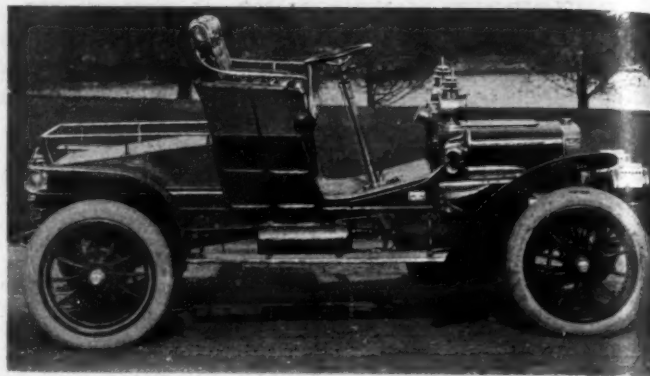
"Six cylinders require ten or more inches longitudinal space in front of the dash in excess of that necessary for four-cylinders; hence a six-cylinder car requires ten or more inches of increased wheelbase, allowing the same tonneau room. The longer the wheelbase, the longer and heavier construction is required to withstand the increased road strains. Six cylinders of equal piston area as compared to that of four will develop much less power than the four, owing to fifty per cent. increased friction of the two extra cylinders and cam bearings. The loss in general results is large, owing to the two extra pistons, the weight of the extra pistons and connecting rods working against the compression on the uplift of two extra valves, and the fact that in addition to the loss of power generated great weight is added to the car by reason of longer wheelbase and extra parts. Six cylinders require a longer and comparatively heavier crankshaft and its liability to twist, spring and break is greatly increased. Accordingly more and larger bearings are necessary.

"The complications and troubles of six cylinders compared with four, naturally increase fifty per cent.; but they seem to increase in a greater ratio. Timing of the engine is one of them; then comes the more complicated system of wiring, of lubrication, of cooling, of getting the proper mixture and distribution of the gas from the carbureter. Much more gas and cylinder oil is consumed for the amount of power, and there is much more battery consumption, and also fifty per cent. more attention to the motor is required. The problem of most manufacturers is to simplify, for the more complications, the greater number of wearing parts, the certain eventual increased annoyances and expense—and hence we regard the six-cylinder car more of a fad than practical for the average of a touring car."

## A FRENCH ENGINEERING DEPARTMENT.

A significant piece of information is the announcement that E. R. Thomas, of the Thomas Motor Co., has established an engineering department in France.

"It is acknowledged that the first practical automobile originated in France," said Mr. Thomas in the course of an interview concerning the move of his company, "and that country more than any other is entitled to credit for the original improvements in the greatest number; but French, German, English, and American manufacturers have been compelled to borrow from each other ideas which have redounded to the mutual benefit of all. Positively no one



ATTRACTIVE SPECIAL BODY FOR 20-HORSEPOWER NORTHERN.

nation is independent of the other, nor can any country justly claim all credit for all improvements.

"The pneumatic tire is English; the hardened-rivet chain, annular bearings, and back-stop safety device are American. The gas engine is German, the application and accepted design French, and all the nations use American tools and many of them American steel. Thus it is proven that no one country is entitled to all credit, but that the high-class automobile is a combination of the best features of the various ideas and products of all countries.

"So you see that the maintenance of an engineering office in Paris is entirely consistent. We have there a corps of noted automobile experts, and they in connection with our own mechanical force are constantly planning and striving to incorporate in the Thomas—an American car, remember—the very best that the whole world can produce."

## RAMBLER SHIPPING FACILITIES.

The final testing and shipping departments of the Rambler factory at Kenosha, Wis., are adjacent to the main building and along the west front of these departments extends the loading track and switches. These tracks aggregate over three-eighths of a mile, and the loading platform is 16x500 feet, a total of 80,000 square feet. The relative arrangement of tracks and platform is such that twenty cars at a time may be placed for unloading and thirty for loading.

Parallel to these tracks is a cinder path used for testing purposes. On this may at all times be found the various models of the Rambler line, and the foreman of the loading crew promptly took advantage of them.

Considerable delay had been caused at times through being compelled to await the action of the railroad company in moving the cars. Seeing the larger models of the Rambler touring cars whirling by gave rise to the idea of using them as a locomotive power. Upon trial this was found to be entirely feasible, and they were thereafter utilized.



HOW THE RAMBLER ACTS AS A LOCOMOTIVE.



## PRESIDENT DICK OBJECTED.

PHILADELPHIA, May 28.—The day of the one-sided hearing and the lightning fine is over—in Montgomery county at least. Magistrate Fitzwater, of Springfield township, just over the Philadelphia line in that county, caught a Tartar in President "Bill" Dick, of the Automobile Club of Philadelphia. It has been the usual custom for the 'Squire to listen to the constable's charge, ejaculate "Twelve dollars and fifty cents fine and costs," and it was all over. Such a thing as a defense was not tolerated. President Dick, however, was not so easy. When he was arrested for doing a quarter in 47 seconds and 'Squire Fitzwater put him through the mill in the usual rapid-fire way he protested because he was not allowed to make a defense, and carried the case to the County Court, where on Thursday last Judge Swartz handed down an opinion sustaining Mr. Dick's appeal on the ground that the Justice's docket was found to be "so irregular and defective."

## NOVEL SUBSCRIPTION PLAN IN WISCONSIN.

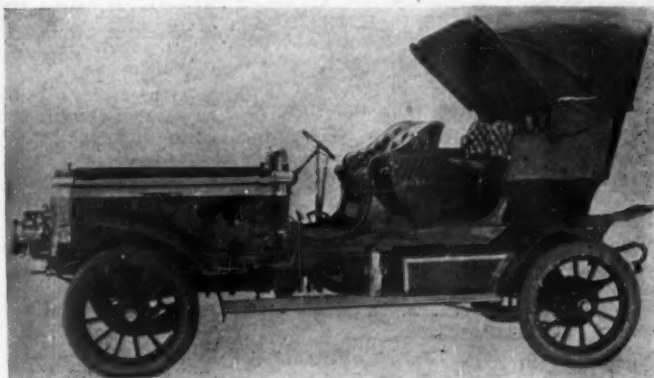
MILWAUKEE, May 28.—Plans for the Wisconsin Auto Transit Company, which will operate automobile 'buses between Manitowoc, Two Rivers, Kewaunee, Mishicot, Kiel, St. Nazianz and intermediate points, during the summer months, are progressing satisfactorily, one of the cars having been ordered. A plan has been devised by the promoters to take the place of issuing stock, and it has been favorably received at Kewaunee. A coupon book entitling the purchaser to twenty-two single trips between Kewaunee and Manitowoc will be issued at a price of \$20, which will be a gain of \$7.50 in the regular rate of four cents a mile, which the company proposes to charge. These tickets will be interchangeable and may be used by any person. Payment is made easy. One dollar, or 5 per cent. of the cost, will be collected upon delivery of the book. Nine dollars more will be asked when the line is in operation, and the balance of \$10 will be due in sixty days from that date.

The "oldest automobilist" has been discovered in London, at the age of 82. His name is George Davis, and he took to the sport eight years ago, at the age of 74.

## A WESTERN 6-CYLINDER CAR.

A recent addition to the number of six-cylinder cars on the American market is the Kansas City car, manufactured by the Kansas City Motor Car Company at its works at Sheffield, Kan. The first machine was finished last week and was shipped to Minneapolis. Forty more of the same type are to be turned out this season, according to the statement of G. K. Wheeler, general manager of the Kansas City Motor Car Company.

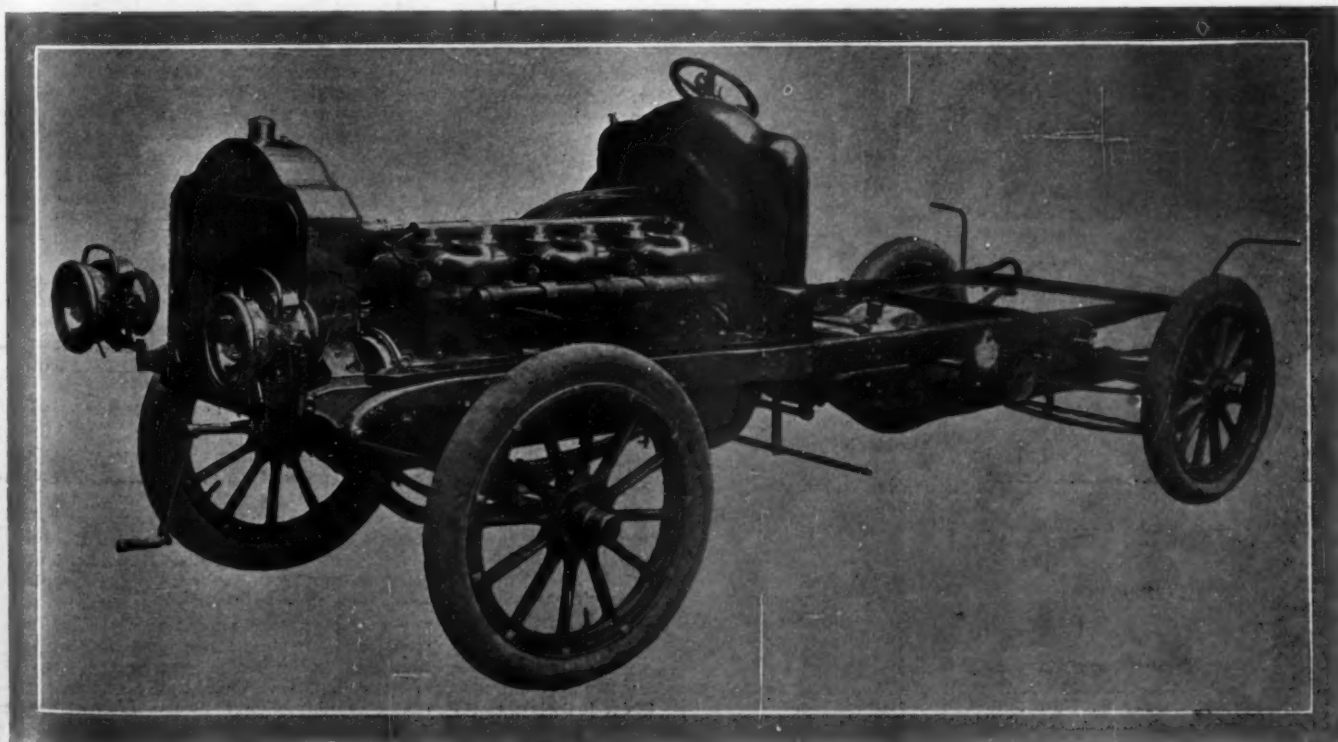
The car is built on conventional lines, generally speaking, having three-speed sliding-gear transmission, countershaft and side-chain



KANSAS CITY MOTOR CAR CO.'S SIX-CYLINDER CAR.

drive, pressed steel framing, and other features of the foreign type of touring car. The cylinders, which are cooled by water, are cast separately and have integral heads, water-jackets and valve-housing; the bore is  $5\frac{1}{8}$  inches and the stroke 5 inches. The valves are all mechanically operated. Ignition is by jump spark, and both magneto and storage battery are supplied.

The wood artillery wheels are 36 inches in diameter and are fitted with 4-inch mechanically fastened tires. The wheelbase is 120 inches. The general appearance of the car is attractive; the long bonnet gives an air of speed, while the pressed steel dash and the outline of the radiator are distinctly pleasing to the critical eye.



CHASSIS OF SIX-CYLINDER CAR MANUFACTURED BY THE KANSAS CITY MOTOR CAR COMPANY.

### RECENT INCORPORATIONS.

Atlas Automobile Co., Pittsburg, Pa.; to manufacture and deal in automobiles; capital, \$200,000.

The Bruno Auto Co., Brooklyn; capital stock \$5,000. Directors: D. H. A. Burns, A. E. Burns, Fred Burns, Brooklyn.

Harris Auto Marine Co., Buffalo; capital stock, \$100,000. Directors: B. P. Angell, W. D. Chamberlain, D. A. Minard, Buffalo.

O'Neill-Ollier Company, Chicago; to manufacture automobile parts. Incorporators, Charles C. O'Neill, L. F. Ollier, S. E. Gillard.

Willink Garage Co., Brooklyn, N. Y.; capital, \$10,000. Directors: H. O. Hyatt, E. H. Banaker, of Brooklyn, and G. E. Austin, New York.

New York and New Jersey Lubricant Co., New York; capital, \$5,000. Directors: T. A. Matthews, W. F. Kimball and F. J. Barnes, New York.

Atlantic Motor Car Co., New York; capital, \$25,000. Directors: J. J. Desmond, New York, R. F. Newton and S. P. Newton, Newark, N. J.

Bruns Automobile Co., of Brooklyn, N. Y.; capital stock, \$5,000. Incorporators and directors, W. H. A. Bruns, A. E. Bruns and Frederick Bruns.

Rochelle Motor Co., New York; capital stock, \$150,000. Incorporators: Edward T. Birdsall, Arthur S. Winslow and George Moore, New York.

Holmes-Booth Auto Co., Cleveland, O.; capital stock, \$25,000. Incorporators, W. N. Booth, E. Holmes, H. G. Dickman, B. J. Erlanger and J. W. Smith.

American Automobile Co., Pittsburg, Pa.; incorporators: M. S. Simms, L. C. Myers, Geo. Edkert, H. S. Stewart. The new concern will locate in the East End.

Park Place Garage and Machine Co., New York; capital stock, \$25,000. Directors, J. E. McKenna, New York; T. W. Galliard, Brooklyn; J. C. McKenna, Jersey City.

Dragon Automobile Co., Kittery, Me., to deal in motorcycles; capital stock, \$550,000. President, Harold P. Knowlton; treasurer, Albert E. Knowlton; Joseph W. Hawes.

Salt Lake Automobile Co., Salt Lake City, Utah; capital stock, \$16,000. President, W. O. Duvall; vice-president, Estella Duvall; secretary and treasurer, W. W. Rivers.

North Shore Auto Passenger Co.; common carriers of passengers; capital, \$50,000. President, S. Harvey Dow, treasurer, U. G. Haskell, clerk, W. S. Flint, Beverly, Mass.

De Long Motor Co., Syracuse, N. Y.; to manufacture motors for boats, automobiles, etc.; capital, \$25,000. Incorporators: M. E. Coe, G. E. De Long and Adolph M. Clark, all of Syracuse.

The Aerocar Co., Cleveland, O.; to manufacture automobiles and parts; capital, \$10,000. Incorporators: D. C. Westenhower, W. J. Rudolph, James C. Brooks, F. C. Howe and Al Welch.

Lewis Carriage Works, Winnipeg, Manitoba; to manufacture automobiles, bicycles, carriages, tools, etc.; capital, \$75,000. Provisional directors, E. Lewis, H. G. Banner and J. W. Bruce, of Winnipeg.

Memphis Automobile Co., Memphis, Tenn.; to deal in automobiles and automobile supplies and to operate passenger and freight automobile lines; capital stock, \$10,000. Incorporators: E. B. Meyer, A. L. Cross, E. L. Menager, William Floyd and F. Zimmerman.

### THE GROWING GARAGE LIST.

The new Winton garage on Euclid avenue, Cleveland, O., which is a modern building of reinforced concrete, is practically completed.

A new garage for the Lubeck Automobile Co., of Grand Rapids, Mich., is under construction. The building is to be of brick, two stories high, 50 feet wide and 70 feet deep.

John F. Kitchen has opened a new garage on Homewood avenue, East End, Pittsburg, Pa., to be known as the Belmar, and will take agencies for two or more cars. The new garage is in the center of the Homewood, Brushton and Belmar districts.

The South Bend, Ind., Automobile and Garage Co. has been incorporated with a capital of \$5,000 to establish salesrooms and garages in South Bend. A number of the stockholders in the Studebaker Bros. Co., of South Bend, are said to be interested in the venture.

A three-story stable at 1080 Madison avenue, New York, is to be remodeled into a garage for Isaac V. Brokaw. The plans filed call for the addition to the building of three stories and the installation of an electric freight elevator. Charles F. Rose is the architect.

A new garage company has been incorporated in Cleveland, Ohio, under the name of the Boulevard Garage Company. The capital stock is \$10,000. The incorporators are Walter Brune, H. J. Dunn, H. R. Hoffman, C. O. Harmon, and Wilson S. Levens. A general garage and repair business will be handled by the new concern.

A garage in Jewett City, Conn., has been made necessary by the large volume of automobile traffic passing through that place, and a company has been formed to establish and conduct such a business. F. G. Waters is president of the new concern and A. A. Young is treasurer. The number of automobiles in and passing through the town is said to be double the number of last season.

### STAGE LINES MULTIPLYING.

Plans are afoot for the organization of a company to operate a line of automobiles from Salt Lake to Provo, Utah, this summer.

Coffeyville, Kansas, has no electric street cars and will therefore soon have a line of electric cabs and 'buses for the transportation of passengers to and from points in and about the town.

Arrangements are being made by Harry K. Johnson of Vicksburg, Miss., to form a company to purchase two sight-seeing automobiles, carrying twenty-five passengers each, to take sight-seers through the historic National Park.

An automobile passenger service is to be inaugurated between the towns of Hooker and Carthage, O. T., forty miles apart. J. S. Morris, a Hooker real estate man, is in charge of the arrangements, and proposes to have two round trips made daily.

An automobile passenger service has been established between Currie's Ranch, Nevada, the present terminus of the Nevada Northern Railway, and Ely, a distance of 75 miles. The route is covered in six hours. The service is only temporary, as the railway is in process of construction and is pushing forward.

Three freight and two passenger cars are to be placed in operation at Macon, Ga., by the Auto Transfer Company, if the plans of H. J. Lamar are carried out. He was in New York recently conferring with manufacturers of trucks and stages. It is planned to operate the passenger cars on regular routes and schedule.

A short line railroad connecting Columbus, Bellefontaine and Lima, Ohio, is being constructed and will probably be equipped with gasoline-electric motor cars instead of the steam equipment originally planned. One

reason for the change of plan is the belief that the motor cars will cost very much less to run than locomotives.

The Interurban Motor Transit Co., of Lexington, Ky., which has been operating a large passenger vehicle for some months past, has purchased another machine to ply on the regular route between Lexington and Nicholasville. Later it is planned to increase the capital stock of the company operating the vehicles, and to put on additional cars.

Students and faculty of the Agricultural and Mechanical College near Byron, Texas, are much pleased with the prospect of an automobile passenger line being established between the college settlement and the town. It is planned to put four cars on the route. The plan is appreciated the more because of the disappointment of the people when a projected electric railroad failed to materialize.

C. W. Gray, of Watertown, N. Y., has started an auto 'bus line and the experiment has thus far met with success. He now has two Packard cars in commission but will have more later. The bodies of the cars were furnished by the H. H. Babcock Carriage Company of that city. It is said that this concern, which is one of the largest in the country, is at once going into the business of building auto bodies.

The Commercial Club of Coldwater, Mich., has arranged details with O. L. Mead, of Detroit, for the operation of an automobile stage line between Coldwater, Quincy and Union City. May 1 was set for the inauguration of the system. To insure the operation of the stages throughout the season, 100 books containing \$6.00 worth of tickets were issued for sale at \$5 each, and fifty of these were sold in Coldwater on the day they were offered. The books are transferable and are good for the entire season.

Frank P. Long of Wilmington, Del., has started an automobile passenger service between Middletown and Odessa, towns about three miles apart, and about 25 miles south of Wilmington. He will have a Winton car, which will carry from ten to twelve people. It is his intention to make a round trip every hour and meet all trains arriving and departing from Middletown. The railroad does not run to Odessa. A trolley line now connects the two towns and the automobile line will cover practically the same route.

Automobiles will come into direct competition with steam passenger trains in Central Wyoming within the next few weeks, when the rush of homesteaders commence to invade the Shoshone reservation district. The automobiles will be used by the Union Pacific railroad to carry passengers from Rawlins to a point about 100 miles distant. The fast trains, which arrive early in the morning, will be met at Rawlins by the automobiles, and as the country is flat and the roads excellent, it is expected that the 100 miles can be covered by early afternoon. The Union Pacific expects to land its passengers at their destination earlier than two competing roads which have rail connections for the entire distance.

The Dewhurst Interurban Automobile Company and the Interurban Motor Traction Company, of Lexington, Ky., have combined and will operate automobile passenger lines from Lexington to Nicholasville, to North Middleton and to Richmond. The line to Nicholasville is already in operation, and the other two lines will be operated as soon as the necessary cars can be obtained. A large garage, repair shop and general waiting room will be built in the center of the city. In addition to its passenger traffic business the company will engage in the general garage business and will also handle freight and express matter. The company will be incorporated with a capital stock of \$50,000.



## NEWS AND TRADE MISCELLANY.

The Ford Motor Co., of Detroit, Mich., announces that it is about ready to make deliveries of the \$500 four-cylinder runabout.

Andre G. Catelain, expert repairer of foreign cars, has removed from 572 West Van Buren street to 1534 Michigan avenue, Chicago.

The McGiehan Mfg. Co., makers of odometers, have reorganized and moved into new quarters at 1557 Broadway, New York City.

The business formerly conducted by Joseph Bentley, of Methuen, Mass., has been incorporated under the name of the Joseph Bentley Hair Company.

Owing to a typographical error in the advertisement of the Novelty Tufting Machine Company, of Chicago, in last week's issue of THE AUTOMOBILE, the street number was wrongly printed. The correct address is 264 Michigan avenue.

New York automobilists desiring New Jersey registration under the new law can apply at Room 511, 1 Montgomery street, Jersey City. Applicants must appear in person, though they need not take their cars along if they do not wish to.

The Detroit plant of Morgan & Wright, tire manufacturers, is entirely new, having been recently built, and is not a factory formerly used by an automobile manufacturing concern, as was erroneously stated in last week's issue of THE AUTOMOBILE.

At the last meeting of the Buffalo Automobile Trade Association the following firms were elected to active membership: Babcock Electric Carriage Company, Knox Automobile Company, Ford Motor Company, G & J Tire Company, and MacNaughton & DuBroy.

The Novelty Tufting Machine Co., of 264 Michigan avenue, Chicago, controlling the patents covering upholstering by machinery of seats and seat cushions, has commenced suit against B. F. Everett, of Detroit, Mich., for an accounting and damages for alleged violation of contract.

R. Gordon Carew, New York agent of the F. B. Stearns Company, has sold a Stearns Pullman to the city of New York, for city officials' use. R. M. Cook, President of the New York Board of Health, also drives a Stearns. The city of Cleveland has also purchased a Stearns for general use in the city departments.

A Boston syndicate of capitalists is said to be interested in a project to centralize the automobile trade of Philadelphia, in a building large enough to give floor space to all the agencies in the city. Representatives of the syndicate have been looking for a satisfactory site in the Quaker City, but have not yet announced their selection.

More building operations are in progress on Michigan avenue, Chicago, in the automobile quarter. The building next to the store of the Excelsior Supply Company is being removed to make room for the erection of a new store for H. Paulman & Company, agents for the Pierce. The new building is to be ready about August 1.

L. E. Myers, of the Chicago Automobile Club, a member of the 1906 A. A. A. Touring Committee, will make the tour this year in the same Columbia car which he used in the Chicago-St. Paul run last season.

Previous to owning this car, Mr. Myers drove the Columbia known as "Old Betsey No. 1," which established the original road record between Chicago and New York. While driving "Old Betsey" Mr. Myers made a record of 14 hours from Chicago to St. Louis, which still stands well up toward the best performance to-day.

Considerable excitement was caused in automobile trade circles by the sudden disappearance of Rene E. Jarrige, well known as an automobilist and dealer in automobiles, and until about a year ago agent for the DeDietrich car in the United States. For the last year Jarrige conducted an automobile supply business at 41 West Thirty-third street, New York; but a few weeks ago he disappeared and it is said that a number of creditors, who are endeavoring to settle up his affairs, are out something like \$50,000.

One of the features of the centennial celebration, which will be held at Colorado Springs during September, in observance of the hundredth anniversary of the discovery of Pike's Peak, will be a big automobile carnival. An endurance run between Denver and Colorado Springs will be one of the events, while a two-days' racing program will be run off on the local track. The celebration will be of national scope. Several companies of United States soldiers will take part, and the presence of Vice-President Fairbanks and possibly President Roosevelt will add eclat to the occasion. Colorado Springs automobile men have planned a special program for Roosevelt Day should the Chief Executive see his way clear to attend.

Anticipating the passage of the act of Congress to remove the revenue duty from denatured alcohol, the Ford Motor Company, of Detroit, has had its experimental force at work determining the best type of carburetor for vaporizing alcohol for internal-combustion motors. Mr. Ford states that the results of the tests have been very gratifying, and that in the case of the six-cylinder type of motor, the average gasoline test of which is 52 horsepower (rated at 40 in catalogue), as high as 60 horsepower was obtained in several tests with alcohol as fuel. Instead of the prony brake, a dynamo is used, the armature being direct-connected to the motor shaft, so that accurate readings can be made not only at all speeds, but over a great length of time.

Bert Holcomb, who still holds the Chicago-New York road record, has probably driven as many miles between sundown and sunrise as any man living. He says that with horn and lanterns in good working order, and a disposition to drive moderately, night driving is as safe and perhaps a little safer than day driving. Roads are practically free of teams and the inability to see the minute details of grade, surface, etc., leaves the motorist comparatively free from nervous strain. Hills are easier climbed or descended, and bad places in the road are frequently gotten over more rapidly than would be the case by daylight. This may sound paradoxical to those who have not tried it, but it is a fact. It is only necessary to have good lights, to give ample warning of your approach and to avoid too high a speed rate in order not only to feel safe but to be safe.

The Whitney Manufacturing Company, of Hartford, Conn., has decided to erect a new plant, and has placed with the

Tide Water Building Company, of New York, a contract for a factory building to be erected according to plans prepared by Architect Wm. A. Boring, of New York. The building will be of reinforced concrete throughout and will be fireproof; dimensions, 228 feet long and 61 feet wide, four stories high. There will be a single-story extension 64 feet square, and the combined floor area will be about 62,000 square feet. Work will be commenced immediately and it is expected that the new quarters will be ready for occupancy about November 1 next. The factory will be divided into three departments to take care of the work in other lines than that of manufacturing chains. Special attention will be given to the comfort of employees, and lunch rooms, smoking rooms, lockers and so on will be provided for them. The new factory will be located on an eight-acre plot of ground near the Hartford Rubber Works, on Hamilton street and Bartholomew avenue, Hartford.

The Maxwell-Briscoe Motor Car Company has been making some private tests during the last month to ascertain the actual cost of operating its cars under real touring conditions, keeping account of cost of gasoline, etc., ton-mileage, and other statistical data. During the last week J. G. Emmerling, of Johnstown, Pa., made a run from Tarrytown to Johnstown. The first section of this test was by way of Nyack, Newark, and Trenton to Philadelphia, a distance of 160 miles. It was accomplished in eight hours, entirely on the high gear and without stopping the engine. From Philadelphia by way of Lancaster, Columbia, York and Gettysburg, to McConnellsburg, 185 miles, was made in eight hours, under the same conditions. The balance of the run to Johnstown via Bedford, 80 miles, was made in five hours, the middle gear being used several times in crossing the mountains. The entire run of 425 miles was made in twenty-one hours, with no adjustments except the tightening of spring clips. Twenty-six gallons of gasoline and a little over a gallon of oil were used. Another trip recently made by a Maxwell car was a record run from Tarrytown to Albany by A. S. Le Vins in five hours and forty minutes, actual running time.

Popular attention has been so strongly focused upon the development of gasoline cars during the past two or three years that many seem to have lost sight of the varied and important improvements which have been made in electric carriages. Columbia Electrics, made by the Electric Vehicle Company, are among the most popular cars outside the gasoline class, and it is interesting to note the leading changes that have been made in them since 1903. Pressed steel frames are now used, decreasing the weight and providing for easy removal of bodies. Mileage has been greatly increased by the more general use of ball bearings, improved motors and batteries and better tire equipments. Controllers are now so constructed that the electric circuit remains closed between the various stops of the lever, doing away with the jerkiness which was formerly noticeable in starting and gaining headway. All Columbia electric town carriages of the coach class have wheel steering. The spur gear form of transmission has given way to the herring-bone type, which is noiseless. In the lighter carriages single motor equipment takes the place of the two motors employed in the earlier models, with the result of increased efficiency and lessened weight. Batteries are now wired in series, permitting simpler arrangement of carriage wiring and controller connections. These and other improvements make the electric carriage of to-day a much more serviceable

and easier controlled vehicle than was its predecessor of a few years ago. The running of an up-to-date electric is so simple that women and children operate them with perfect assurance.

#### NEW AGENCIES ESTABLISHED.

The Boston Mechanical Company, Motor Mart, Boston, has taken the local agency for the Moon car, made in St. Louis.

Solliday & Company, Third and Wells streets, Milwaukee, Wis., have taken the agency for the Queen car, made by the C. H. Blomstrom Company, of Detroit, Mich.

John H. Gardner and Albert Kauffman have organized the Carlisle Auto & Supply Company at Carlisle, Pa., with offices and garage at 13-15 Main street that city.

A new importing house, the Itala Import Company, has been formed in New York City, and established offices, showrooms and a mechanical department at 41 West Fifty-fifth street. E. Lillie, formerly American representative of the Mors, is president and general manager of the new company, which will handle the Itala car, made at Turin, Italy.

On June 1 the Warner Instrument Company of Beloit, Wis., will open a Chicago branch at 1251 Michigan avenue, under the management of A. J. Inderrieden. The new location is admirably adapted for the requirements of the company's rapidly growing business. During the coming month all automobilists calling at the new Chicago store will be presented with the Warner Company's booklet, "Auto-Pointers," free of charge. The book retails at 50 cents, and is of much interest and value to all who drive cars.

#### PERSONAL TRADE MENTION.

W. F. Winchester, who has been driving the Franklin at race meets the past few seasons, has accepted a position with the Babcock Electric Carriage Company of Buffalo.

John T. Rainier, president of the Rainier Company, of New York, will sail July 1 for a four months' trip abroad, during which time he will tour the continent in a Rainier.

W. R. Densmore, until recently traveling representative of the National Association of Automobile Dealers, is now associated with C. B. Penney of the Jaynes Automobile Company of Buffalo.

Dan Canary, of Chicago, well known years ago as an accomplished bicycle trick rider, is now associated with Frank T. Fanning in the handling of Michelin tires in the Windy City. The firm moved into new quarters at 1251 Michigan avenue last week.

John L. Poole, for several years general foreign representative of the Olds Motor Works, has resigned his position with that company to accept a similar one with the Aerocar Company of Detroit. Mr. Poole was one of the first American representatives to go abroad in the interests of the automobile industry, and during the past four years has visited every continental country from Africa to Russia. Ever since the advent of the safety bicycle Mr. Poole has been identified with matters awheel, and has been a very successful marketer of goods.

William Herrick, treasurer and manager of the William Herrick Company,

1344 Michigan avenue, Chicago, agents for the Peerless and Orient, died on Friday, May 25, the result of an attack of apoplexy while at luncheon the Tuesday previous. Mr. Herrick was also treasurer of the Drake Electric Company. He was but 40 years old at the time of his death, and for years had been a conspicuous figure in the automobile and bicycle industry. Until two years ago he was manager for Morgan & Wright, a position with which he was identified for fourteen years. His first business experience was in the hat store of his father, who died about a year ago. His mother survives him, as does also a widow and an 8-year-old son. His sudden death will be a severe shock to his many friends throughout the country.

#### TRADE PUBLICATIONS.

MORAWETZ CO., MILWAUKEE, WIS.—Catalogue of fur garments for automobilists.

CHAS. KAUFMANN, OSHKOSH, WIS.—Catalogue of brass launch fittings of all kinds.

YORK MOTOR CAR CO., INC., YORK, PA.—Catalogue of Pullman gasoline touring cars.

SHERWOOD MFG. CO., BUFFALO.—Catalogue of steam boiler specialties, lubricators and the like.

COLUMBUS BUGGY CO., COLUMBUS, O.—Catalogue of electric pleasure vehicles, open and inclosed.

WALLACE BARNES CO., BRISTOL, CONN.—Catalogue of small springs of all kinds and for all purposes.

CORTLAND FORGING CO., CORTLAND, N. Y.—Catalogue of forgings for automobile tops, rails and the like.

WESTERN TOOL WORKS, GALESBURG, ILL.—Catalogue of Gale gasoline automobiles for pleasure and business.

PALMER BROS., COS COB, CONN.—Catalogue of launches, gasoline marine engines, stationary engines and so on.

NEW ERA GAS ENGINE CO., DAYTON, O.—Catalogue of stationary gas engines from 10 horsepower to 125 horsepower.

SCHACHT MFG. CO., CINCINNATI.—Catalogue of Schacht gasoline automobiles with 30-horsepower four-cylinder motors.

DAVIS W. SHULER & SON, AMSTERDAM, N. Y.—Circular illustrating and describing suspension springs for automobiles.

LONG MFG. CO., CHICAGO.—Catalogue of radiators, fans, hoods and fittings for these components for gasoline automobiles.

HOLSMAN AUTOMOBILE CO., CHICAGO.—Catalogue of Holzman high-wheel buggy type automobiles with steel cable drive.

MODEL GAS ENGINE WORKS, AUBURN, IND.—Catalogue of Model gasoline automobiles, 16 horsepower and 24 horsepower.

MOTOR & MFG. WORKS CO., ITHACA, N. Y.—Special circular illustrating and describing the Ejector muffler for gasoline engines.

HENRY SHEA, BROOKLYN, N. Y.—Illustrated circular describing the P. T. C. power driven tire pump, to be carried on the car.

G & J TIRE CO., INDIANAPOLIS, IND.—Illustrated circular describing the G & J automobile tires and tire accessories for 1906.

LOBEE PUMP & MACHINERY CO., BUFFALO.—Illustrated circular describing the Lobe circulating pumps for internal combustion motors.

ST. ANNE KEROSENE CO., ST. ANNE, ILL.—Catalogue of kerosene automobile motors with two and four cylinders, and also transmissions.

WRAY PUMP & REGISTER CO., ROCHESTER, N. Y.—Catalogue of tire pumps, simple and compound, pressure indicators and automobile jacks.

NATIONAL MOTOR VEHICLE CO., INDIANAPOLIS, IND.—Catalogue of National gasoline touring cars with four-cylinder and six-cylinder motors.

HERSCHELL-SPILLMAN CO., NORTH TONAWANDA, N. Y.—Catalogue of four-cylinder and six-cylinder gasoline motors for automobiles and trucks.

STANDARD CARRIAGE LAMP CO., CHICAGO.—Catalogue of acetylene, oil and electric lamps for automobiles; also gas generators for acetylene lamps.

WESTON-MOTT CO., UTICA, N. Y.—Catalogue of automobile front and rear axles, driving gears, brakes, hubs, bearings, rims and other component parts.

AMERICAN & BRITISH MFG. CO., BRIDGEPORT, CONN.—Catalogue of pressed steel frames for automobiles, and also spring hangers and like components.

WHITE SEWING MACHINE CO., CLEVELAND, O.—"What People Say About the White Steamer," a pamphlet of testimonials from satisfied users of the White steam car.

PACKARD MOTOR CAR CO., DETROIT, MICH.—Illustrated price list of parts of the Packard 24-horsepower car. A complete list, giving the prices of all parts from a bolt upward.

THE POST & LESTER CO., Hartford, Conn.—Complete catalogue of automobile supplies and accessories of all kinds, including lamps, horns, tools, clothing, ignition apparatus and so on.

CHICAGO BATTERY CO., CHICAGO.—Catalogue of Duro dry storage batteries and electric lamps for automobiles; the lamps run from the smallest miniature lamp to the full-sized searchlight.

CHARLES E. MILLER, NEW YORK.—Large catalogue of automobile supplies and accessories of all kinds. A very complete and comprehensive book, which lists everything necessary and incidental to an automobilist's equipment.

MOTSINGER DEVICE MFG. CO., Pendleton, Ind.—Catalogue illustrating and describing the auto-sparker, an ignition dynamo for automobile, stationary or launch engines. The dynamo is fitted with a governor for maintaining constant speed.

#### IMPORTS AND EXPORTS.

Following is the official record of imports and exports of automobiles and parts of autos by the United States for the month of March, 1906, and for the nine months ending with March:

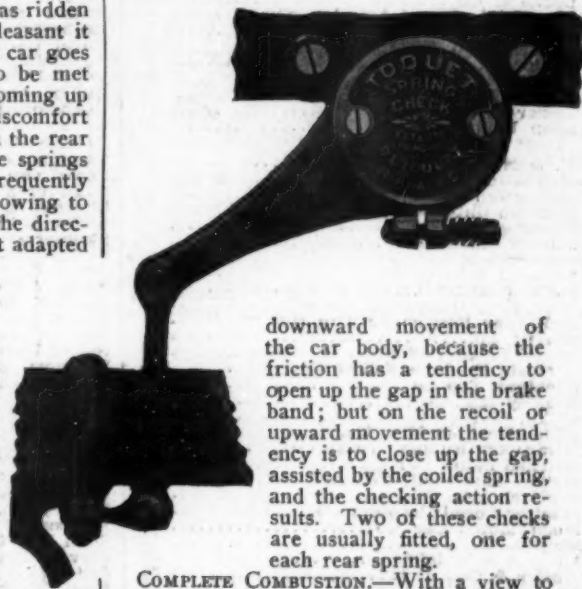
	Imports.		Exports.	
	March, 1906.	Nine Mos. ending March, 1906.	March, 1906.	Nine Mos. ending March, 1906.
	No.	Value.	No.	Value.
Automobiles	80	\$263,928	744	\$2,694,093
Parts of autos	—	43,797	—	279,367
		\$307,715		\$2,973,460
Exports by Countries.				
Country.	March, 1906.	Nine Mos. ending March, 1906.	March, 1906.	Nine Mos. ending March, 1906.
United Kingdom	\$70,414	\$541,431		
France	16,035	139,226		
Germany	10,413	45,742		
Italy	40,418	171,628		
Other Europe	12,207	102,469		
British No. America	69,094	353,717		
Mexico	34,611	201,121		
W. Indies & Bermuda	9,996	220,424		
South America	3,991	52,032		
British East Indies	369	28,733		
British Australasia	10,774	129,620		
Other Asia and Oceania	9,857	40,767		
Africa	5,219	26,094		
Other countries	163	11,880		
Total		\$293,861		\$2,064,874



## INFORMATION FOR BUYERS.

**SPEED INDICATOR.**—An attractive instrument combining a speed indicator, a trip odometer, a season or total odometer and a one-day clock all inclosed in a round bronze casing, is manufactured by the Acme Auto Meter Co., of 442 Water street, New York. The instrument is driven by flexible shaft from gearing attached to one of the front wheels of the car, and is fitted with a bracket for attachment to the dashboard. The bracket is pivoted, so that the dial can be set at any angle that the driver of the car finds most convenient. The speed-indicating scale occupies the upper semicircle of the dial and is marked in large, clear figures up to 65 miles an hour. Instead of pivoting the indicating hand in the middle of the dial in the usual way, the hand is pivoted inside the case, out of sight, but carries a pointer which is bent over the edge of the dial, moving in a slot, and so leaves the middle of the dial clear for other purposes. Partly in the semicircle and extending a little below it is the clock dial, also marked very plainly, with a seconds dial near the top. Below the clock are the odometers, the trip odometer reading to 999.9-10 miles and the total odometer reading to 9,999 miles. A knob is provided for setting the trip odometer back to zero. The Acme instruments are also made without the clock and without either clock or odometers; where the clock is omitted the hand or pointer is pivoted in the center of the dial in the usual way. The plain speed indicator can be made to register up to 130 miles an hour, for use on racing cars.

**SPRING CHECK.**—Everyone who has ridden in an automobile knows how unpleasant it is to be tossed in the air when the car goes over a "thank-you-ma'am" and to be met when half way down by the seat coming up again. And in addition to the discomfort caused the passengers, especially in the rear seats, these bumps are hard on the springs and the sudden and violent recoil frequently results in a broken leaf or leaves owing to the stress placed on the spring in the direction in which the spring is the least adapted to resist. One of the latest devices designed to obviate this undesirable spring action is the Toquet spring check, manufactured by B. Louis Toquet, of South Norwalk, Conn. This check consists of a drum, attached to the frame of the car, a band encircling the drum after the manner of a brake band, an arm extending from and formed integral with the band, and a connecting rod extending from the end of the arm to a bracket attached to the spring or axle. The connecting rod is attached at both ends by joints; the arrangement of the parts will be clearly seen in the illustration. The band encircling the drum is split at one side and the ends are drawn together by a spring arrangement, so that wear is automatically taken up and the stiffness of the check is practically constant. The brake band is lined with leather to give a smooth action. By tightening up the nut behind the spring the stiffness of the check can be adjusted to a nicety. One of the features of the de-



vice is that there is very little resistance to the compression of the spring on the downward movement of the car body, because the friction has a tendency to open up the gap in the brake band; but on the recoil or upward movement the tendency is to close up the gap, assisted by the coiled spring, and the checking action results. Two of these checks are usually fitted, one for each rear spring.

**COMPLETE COMBUSTION.**—With a view to producing complete combustion of the gasoline used in internal-combustion motors, and thus avoiding sooting of the plugs and cylinders and odorous exhaust, a substance called "No-Ko-Rode" has been placed on the market by the No-Ko-Rode Co., of 225 Dearborn street, Chicago. The manufacturers state that in addition to preventing the fouling of the engine and plugs, this compound increases the power developed by making the combustion complete.

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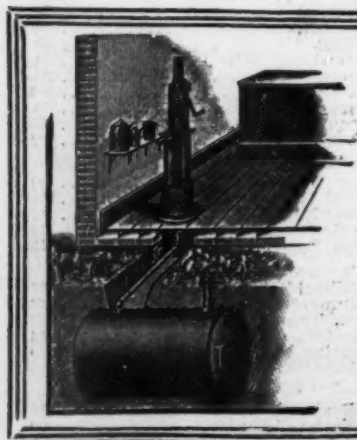
**FOR SALE**—Bargain. Running gear, with tires; two oil lamps, one muffler, one carburetor. 912 Raspberry St., Erie, Pa. May 31

**FOR SALE**—National electric runabout, with new oxide battery. Tires extra heavy. Northern Mfg. Co., Detroit. June 14

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